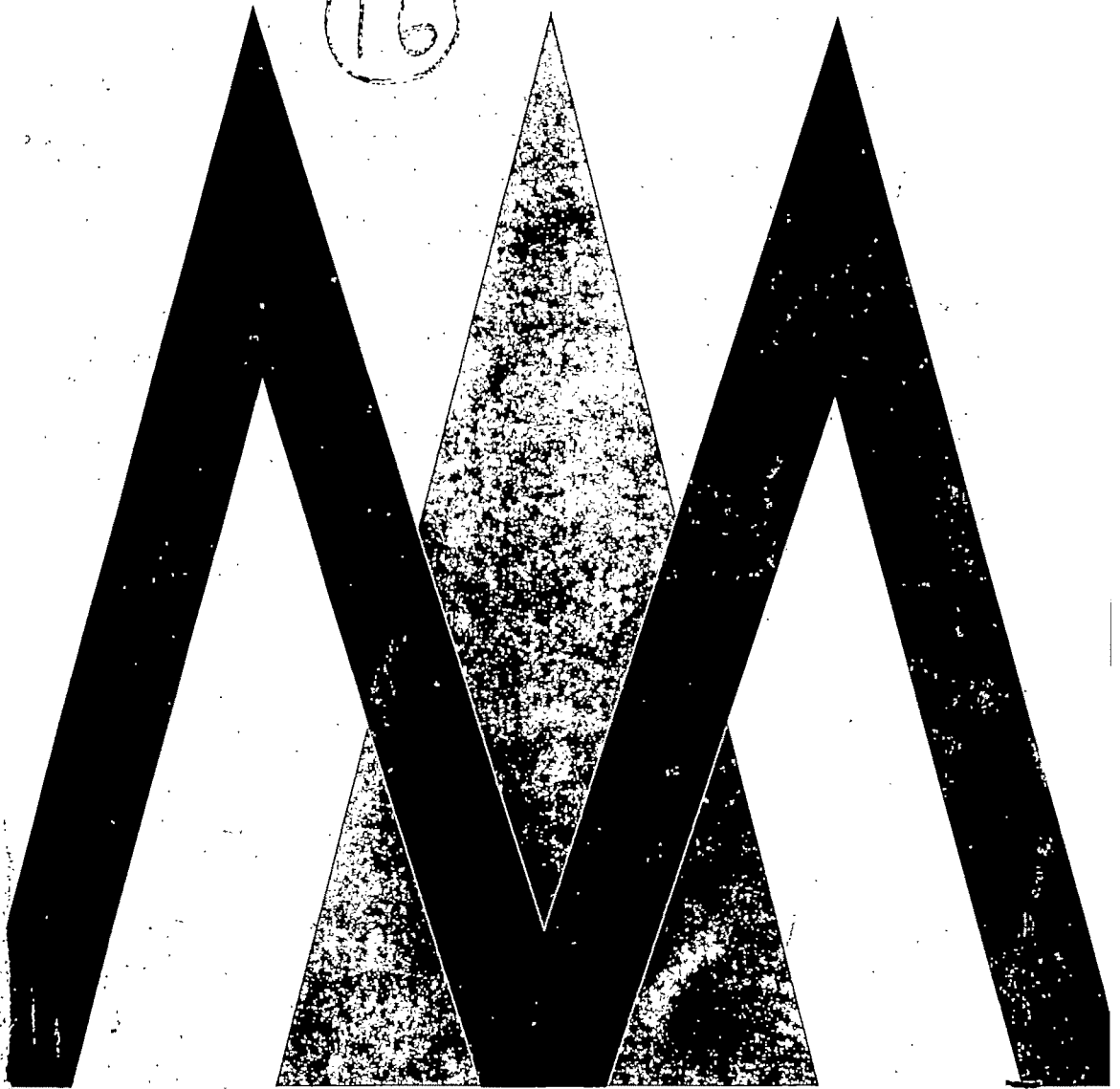


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AMJ publishes only original, empirical research as articles or research notes. The *Journal* does not publish purely theoretical articles; these are published by the *Academy of Management Review*. Papers that are primarily applied in focus and that have managers as an intended audience should be submitted to the *Academy of Management Executive*.

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Submissions should be sent to Professor Richard T. Mowday, *Academy of Management Journal*, College of Business Administration, University of Oregon, Eugene, Oregon 97403-1208.

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FROM THE EDITOR

Beginning with this volume, *AMJ* will include a short abstract with all research notes it publishes. Our goal in initiating this change is to make research notes more accessible to our readers and to abstracting services. We have also increased the maximum length of research notes from twelve to fifteen double-spaced typewritten pages. Authors submitting papers they wish to be considered as a research note should include a 50-word abstract. In addition, it is useful when authors explicitly note whether they wish their paper to be reviewed as an article or as a research note. In the absence of any clear indication, reviewers tend to assume that papers are submitted as articles.

Also effective with this issue, Louis (Jodie) Fry has stepped down from the editorial review board, a position he assumed in June 1986. During his time on the board, Jodie has made important contributions to the *Journal* by offering authors comprehensive and insightful comments on their work. Jodie's contribution to the *Journal* has been very much appreciated and we wish him well in his new endeavors.

While most readers will scarcely notice a difference, this issue of *AMJ* marks the first to be produced by Sheridan Press. Although Darby Printing and Repro Services of Atlanta have provided many years of faithful service, our move to a new printer will allow us to provide authors with more effective service at a lower cost. For instance, authors will now receive page proofs of their articles instead of galleys. Thus, authors will have a chance to review their work exactly as it will appear in the *Journal*.

R. T. M.

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MANAGEMENT-BOARD RELATIONSHIPS, TAKEOVER RISK, AND THE ADOPTION OF GOLDEN PARACHUTES

HARBIR SINGH

FARID HARIANTO

University of Pennsylvania

This study compared the characteristics of the top management and boards of directors in large firms that have adopted golden parachutes for CEOs with those of an industry- and size-matched control group. The results indicated that firms that have experienced takeover threats are more likely to adopt golden parachutes than firms that have not. The findings also showed that firms adopting golden parachutes have relatively higher diffusion of stock ownership, higher tenure of the CEO vis-à-vis that of board members, and a higher proportion of external directors on their boards.

In the current merger wave, there have been two profound, interrelated developments in American corporations: the increasingly significant role of boards of directors in major acquisitions (Bacon, 1985) and the adoption of various takeover defense provisions in most *Fortune* 500 corporations (Magnet, 1984). "Merger mania" has also resulted in the creation of incentive packages for incumbent management teams as insurance against the possibility of takeover. These incentives, termed golden parachutes, involve a renegotiation of top-management compensation contracts to include very sizable payments to be made in the event of a takeover. Golden parachutes have been attacked as being nothing more than "insurance against incompetence" (Morrison, 1982). Golden parachutes, however, can also be viewed more positively as contingent compensation designed to foster objectivity in incumbent management's review of takeover proposals.

Stockholder activism, spearheaded by coordinated institutional investors like the Council of Institutional Investors, has created immense pressure on management to abandon various measures, including golden parachutes, which some stockholder activists see as a neglect of shareholder interests (Nussbaum & Drobrzynski, 1987). Critics of the adoption of golden para-

We would like to thank Edward Bowman, Steve Kobrin, Hans Pennings, David Thomas, N. Venkatraman, and the anonymous reviewers for their comments and Eirene Chen, Craig Stevens, and Bina Sassoon for their research assistance. We gratefully acknowledge support for this research project from the Reginald H. Jones Center and from the Junior Faculty Research Fund at the Wharton School of the University of Pennsylvania.

chutes argue that managers should be rewarded for their performance during the time they are in control of the assets of a firm and that losing control of the firm should not be a basis for compensation, particularly at the levels reported for some salient transactions. Prokesch (1986) described the controversies surrounding the golden parachute payments in several transactions by *Fortune* 500 firms, and Sloan (1983) gave a detailed account of the Bendix-Marietta transaction. Another line of argument against golden parachute adoption concerns symbolic labels attached to the loss of corporate control—critics call golden parachutes rewards for failure. A third criticism pertains to distributive justice: why should golden parachutes be made available to a very few top executives and not to the many other members of management teams? Proponents of this point of view contend that golden parachutes reflect the influence chief executive officers (CEOs) have on their boards.

The central issue underlying these concerns is how changes in corporate control are perceived. If loss of control by a management team is seen as displacement by a better team, a golden parachute payment would induce incumbent management to not resist. If, however, incumbent management resists a takeover bid but has no effect whatsoever on the outcome, golden parachute compensation would be unnecessary payment for loss of control. Boards of directors therefore must evaluate a complex set of factors, many of which are hypothetical.

Golden parachute adoption is very significant both theoretically and empirically. First, the ratification of contracts containing golden parachute proposals is clearly a directorial responsibility. Such ratification represents an outcome of board-level decision making that is measurable and unambiguous. In those respects, it differs from other outcome measures that have been employed. For example, connecting board characteristics with corporate performance as a proxy for board effectiveness involves many measurement difficulties. Additionally, proxy filings with the Securities and Exchange Commission (SEC) must mention the existence of golden parachutes in the compensation contracts of top management, so data are readily available.

It is reasonable to expect that board members as well as management will view the evaluation of a takeover bid as central to their responsibilities. In a survey by the Conference Board on the role of directors in major acquisitions, Bacon found that directors perceive that "their role . . . is perhaps never so clear to all parties concerned as it is in the case of a major acquisition or merger proposal" (1985: 3). On the basis of observation of several boards and experience as a board member, Gaddis (1987) noted that boards assess takeover bids in terms of both their economic justification for shareholders and their implications for their managers. The potential for massive directorial liability has also forced boards to evaluate takeover bids seriously. A final and most significant point is that in deciding about golden parachute adoption, boards and managements are dealing with a hypothetical and uncertain threat. A takeover may or may not happen, and conse-

quently, a management team may or may not get their contingent compensation. The exact size of golden parachute payment is also open to question, and the uncertainty about the probability of a takeover attempt complicates judgments about amounts of payment. Golden parachute adoption therefore provides an interesting area for both theoretical and empirical inquiry.

Prior research on the characteristics of boards adopting golden parachutes by Cochran, Wood, and Jones (1985) has suggested that they have more outsiders than those that do not accept golden parachutes. That study was based on a sample of 406 firms in the *Fortune* 500 of which 52 had adopted golden parachutes as of December 1982. However, information about prior takeover attempts, managerial incentives, and ownership structure can augment that interesting finding to deepen understanding about the context in which golden parachutes are adopted. Another empirical study on the stock market's reaction to golden parachute adoption (Lambert & Larcker, 1985) found that the effect of such an announcement was positive and statistically significant. Given these results, we concluded that stockholders perceive golden parachutes as in their interest because managers may view takeover attempts more objectively if they have a golden parachute contract. From this perspective, golden parachutes are contingent compensation contracts for top managers that help align their interests with those of their stockholders, who stand to make sizable gains in the event that the firm is acquired (for a review of evidence on gains to the stockholders of acquired firms, see Jensen and Ruback, 1983).

This study examined the ownership structure of firms adopting golden parachutes, the context, in terms of prior takeover attempts, in which golden parachutes are adopted, and the characteristics of CEO-board relationships in such firms. An underlying premise of this investigation was that the adoption of golden parachutes may reflect the influence of a firm's CEO on its board of directors, but that such influence depends on the occurrence of a takeover threat. This study extended prior work to include such factors as other compensation of top management, ownership structure, board composition, and operational indicators of takeover threats.

THEORETICAL CONSIDERATIONS

Perspectives on Board-Management Relationships

There has been considerable work in both economics and the behavioral sciences on the relationship between managerial compensation and behavior. Two perspectives, agency theory and managerialism, are especially relevant to studying the adoption of golden parachutes. In comparing the agency perspective on the development of managerial incentive contracts with the managerialist perspective, we focused on apparent differences in assumptions concerning the nature of organizational decision-making processes, the locuses of corporate control, and the role of boards and their relationships with top management. Table 1 summarizes, in a stylized fash-

TABLE 1
Theoretical Perspectives on Board-Management Relationships

Key Factors	Agency Theory	Managerialism
Conceptualization of organizations	Nexus of contracts	Arena of influences, possibly dominated by management
Presumed objective of firms	To maximize stockholder wealth	To survive and balance stakeholders' interests
Locus of control	Markets for managerial labor, outside directors' reputations, and corporate control	Managerial discretion
Conceptualization of managerial behavior	Opportunistic, unless monitored effectively	Self-perpetuating
Role of boards of directors	Monitoring entity to protect shareholder interests	Considerably influenced by incumbent management

ion, the differences between the agency and managerialist perspectives on those five key factors.

Agency theorists (Jensen & Meckling, 1976) have proposed that the relationship between managers and stockholders can be understood in principal-agent terms: managers are the agents in control of assets owned collectively by stockholders and receive compensation for their performance in managing the assets of a firm. The firm's board of directors is viewed as an entity charged with monitoring the managers' performance to ensure that they achieve their fiduciary duties of maximizing shareholder wealth. Since the typical takeover significantly benefits shareholders, the adoption of a contingent compensation contract for top managers would help to match their interests with those of shareholders and reduce conflict of interests of an unanticipated takeover bid occurs.

According to the agency perspective, a firm is "a set of contracts among factors of production, with each factor motivated by its self-interest" (Fama, 1980: 289; Jensen & Meckling, 1976). If a firm is a nexus of contracts, all contracting parties involved (the various production factors) will want representation on a board to protect their interests. However, other market-induced institutions—unions, for example—can also be used to influence management, so each factor may not have a representative on a board. Baysinger and Butler (1985) suggested that a board of directors is one of many elements of corporate governance structure, including corporate law, product and capital market competition, the managerial labor market, and the market for corporate control. They further maintained that if the market for corporate control and the managerial labor market function effectively, it will be difficult to isolate the role of a board in monitoring management decision making. Fama (1980) has argued that the essence of a board is that it provides a low-cost mechanism for monitoring top managers. It provides continuous and cost-effective monitoring, in contrast to the discrete change of management that may occur through a takeover.

In view of the possible differences in the overall objectives of managers (agents) and stockholders (principals), an agency theorist would view the adoption of golden parachutes as a solution to the problem of how to approximate the optimal alignment of the interests of the two through compensation to top management. Maximization of the market value of a firm's assets is in the best interests of both managers and stockholders. Recent analytical research on contracts has shown that no contract can completely compensate for the stochastic nature of the managerial task environment (Holmstrom, 1982). Accordingly, incentive compensation to top management, including golden parachutes, may serve to improve the alignment of top management's objectives with those of a firm's stockholders.

Proponents of a managerialist perspective on the relationship between boards and top management argue that board decisions are outcomes of an influence process managed by CEOs. If CEOs have substantial sway over board-level decision making, boards would tend to rule in favor of the CEOs on issues involving trade-offs between the latter's interests or the interests of top management and those of stockholders. Proponents of this perspective view the ratification of golden parachute contracts as a manifestation of broader organizational influence processes that include decisions on top-management incentive compensation.

The basic premise of this perspective is that managers have a high level of discretion in effecting organizational change but that external monitoring mechanisms are limited in their effectiveness (Hirsch & Friedman, 1986). Advancing the notion of managerial influence on organizational outcomes, Perrow asserted that "organizations are tools in the hands of masters . . . and the masters are in substantial command in most organizations" (Perrow, 1986: 177). Managerialists view organizations as seeking control of their environments and reduction of their dependence on critical resources through mechanisms like interlocking directorates (Pennings, 1980; Pfeffer, 1972) and co-optation (Pfeffer & Salancik, 1978; Selznick, 1949; Thompson, 1967). Typical mechanisms used to co-opt external directors include the provision of lucrative contracts, consulting assignments, and the like. Authors in this line of research view stockholders as only a subset of the major constituencies whose demands management teams need to satisfy. Similarly, Freeman (1983) developed a stakeholder view of firms. Stakeholders include external constituencies like the customers, unions, and societal groups affected by a firm and, in some cases, government regulators, as well as internal constituents like employees. The role of management is to balance the interests of the various stakeholders, including stockholders.

The extent of CEOs' influence on their boards is a matter of degree, and various proponents of the managerial perspective differ as to the weight they assign to management influence on boards. In the strong version of this perspective, boards are referred to as tools of management (Mace, 1971). For instance, researchers have argued that boards of directors are often merely titular representatives of stockholders—or, at times, other stakeholders—and that corporate officers and CEOs can strongly influence them to obtain

decisions that may not be in the best interests of their stockholders (Herman, 1981; Mace, 1971). More moderate proponents of managerialism view the direction of influence in board-management relationships as reciprocal. Although CEOs often control the nomination of new board members and thus influence on-going board-management relationships, boards still hold ultimate, bottom-line, control over management and can appoint and replace CEOs (Alderfer, 1986; Mizruchi, 1983). The power of boards becomes apparent especially when a company is in crisis, for instance, when its performance is poor or when it becomes a target of acquisition.

In this context, the adoption of golden parachute contracts that are tied to the critical event of being taken over involves a contest of influence between a firm's board of directors and its incumbent management. Management is viewed as exerting an on-going influence on the board, especially on matters involving management's own interests. On the other side, the board becomes increasingly critical in evaluating proposals related to acquisition and will exercise its own power in such matters.

In noncrisis situations, the influence of boards also stems from their various functions: establishing contacts and raising funds, providing management teams with expertise and advice, and co-opting external influences. In his survey of 855 corporations, Bacon (1973) found that 41 percent of all outside directors were lawyers, bankers, investment experts, or consultants. It thus appears that one of the primary roles of outside directors is to provide advice and expertise to the firm that recruits them. The managerial perspective on CEO-board relationship allows for the existence of varying degrees of CEO influence on boards but does not presume, as the agency perspective does, that boards are neutral monitors of managerial decision making.

The adoption of golden parachutes is best studied by applying each perspective in its area of major emphasis. As we discuss each independent variable, we refer to its theoretical antecedents in the two perspectives.

The Incidence of Takeover Threats

The important implication of an agency perspective for golden parachute adoption is that if there is, *ex ante*, a measurable and significant probability of takeover, managers may demand some contingent compensation for this (from their viewpoint) undesirable event. The argument from an agency perspective is that such contingent compensation will diminish the conflict between top management's personal interests and stockholders' interests. Indeed, from this perspective, if a contract is optimally devised, it may motivate management to not resist a legitimate attempt by another, better-equipped management team to obtain control of the firm involved.¹ This perspective implies that the role of a board in examining a management

¹ In reality, however, a contingent contract would at best approximate the optimal contract. Arrow (1985) notes that contracts in reality seldom contain the level of formality and precision ascribed to them in theory.

proposal to adopt golden parachutes would be primarily analytical: directors would examine the odds of a takeover's occurring and calibrate the magnitude of contingent compensation necessary to motivate incumbent management to view a takeover attempt from the perspective of the firm's stockholders. In this study, however, we were concerned primarily with the likelihood of golden parachute adoption and not with the size of the compensation involved. Drawing on agency theory, we developed our first hypothesis:

Hypothesis 1: Boards of firms that have experienced a prior takeover attempt will have a greater likelihood of adopting a golden parachute contract than boards that have not.

The Roles and Characteristics of Boards

From an agency perspective, boards of directors "always possess the power to hire, fire, and compensate the top-level decision managers and to ratify and monitor important decisions" (Fama & Jensen, 1983: 310). The efficacy of boards is viewed as depending on their ability to function as experts, which includes their ability to use information from internal and external sources. Fama and Jensen hypothesized that desires to develop reputations as experts in decision control and to be objective representatives of stockholder interests motivate outside board members. Board memberships are regarded as a signal of expertise in monitoring managerial performance.

Research from the managerialist perspective complements this view by pointing to board size, composition, and CEO tenure vis-à-vis board member tenure as indicators of the possible influence CEOs exert on proceedings in board meetings. We address the managerialist perspective in more detail in the following discussion on board size and board composition.

Board size. The size of a board reflects the complexity of the organization it serves. It is fair to expect that all board members will carry with them the interests of the constituency that they represent. As a board grows, so does the spectrum of interests it represents. In a study of board composition in hospitals, Pfeffer (1973) showed that board size correlated very well with a hospital's budget and with the proportion of funds obtained from private donations. He further indicated that the larger the board, the greater the importance of influence on stakeholder groups as a criterion for gaining board membership.

We therefore expected that in firms with large boards, top managers would have greater difficulty influencing all board members to agree and make decisions, including a decision to implement golden parachutes, than they would in firms with small boards. In the absence of other research, the applicability of findings about hospitals to other settings needs empirical support, and providing such support was a goal we could address through this study.

Hypothesis 2: The larger the size of the board of a firm,

the lower the likelihood that the board will adopt golden parachutes.

Board composition. Agency theorists presume that outside directors are objective and independent, especially in evaluating issues closely related to the fate of internal managers. Boards are seen as arbiters and as final courts in disputes that arise among internal managers and between a management team and stockholders (Fama, 1980; Fama & Jensen, 1983). From an agency perspective, in evaluating top-management incentives, including golden parachutes, outside directors will resist attempts by inside directors to influence board decisions.

Agency theorists do not make any explicit arguments about the proportion of outsiders on a board that will ensure neutrality; instead, the objectivity of outside directors is linked to their expertise and governed by their external reputations. Legal scholars and corporate reformers, on the other hand, have argued that to become an effective governing body, a board should have a majority of outside members (e.g., Eisenberg, 1975; Nussbaum & Dobrzynski, 1987). Similarly, viewing board decision making as an influence process, managerialists evaluate the relative potency of outside and inside directors on the basis of the proportion of outside directors. The managerialist perspective shares the agency assumption of the objectivity of outside directors. Mizruchi (1983), for example, argued that a board's ability to retain bottom-line control, or to oust or retain CEOs, is conditional upon the independence of outside directors.

The effect of board composition on the adoption of golden parachutes is twofold. In the presence of takeover threats, a board will assess the possibility and impact of such threats. If the board views golden parachute contracts as a way to align the interests of management with those of stockholders and has confidence in the incumbent management, it would be highly likely to adopt the golden parachute contract. Where takeover threats are apparent, both inside and outside directors will arrive at the same conclusion, to adopt golden parachutes, although they may have very different motives: the insiders may be concerned primarily with their (management's) self-interest, and the outsiders would think in terms of interest alignment. In other words, in the presence of takeover threats, board composition will have no effect on the likelihood of golden parachute adoption.

In the absence of takeover threats, top management would still see it as in their interest to adopt a golden parachute contract proposal and will pursue that goal through internal directors. Consequently, the proportion of outside and inside directors on a board will be a key determining factor in the decision to accept such a proposal. Therefore, from a managerialist perspective,

Hypothesis 3: In the absence of a takeover threat, the higher the proportion of outside directors on a board, the more difficult it is for top management to influence it, and thus the lower the likelihood that a board will adopt golden parachutes. In the presence of a takeover threat,

board composition will have no differential effect on the adoption of golden parachutes.

CEO Influence and Relative Tenure

The tenure of incumbent officers, both company executives and outside directors, is an indicator of organizational influence. Long tenure on a board leads to a high level of familiarity with an organization's resources and with its methods of operation, technology, and culture. Great familiarity with an organization can in itself be a source of personal power (French & Raven, 1959; Zald, 1969). Thus, we expected that length of tenure would also reflect the extent of organizational influence that officers hold.

Previous research has argued that the length of organizational participants' service fosters the development of "cohorts," groups that show solidarity, make mutual choices, and engage in competition or rivalry (Pfeffer, 1982: 286–287). Cohorts consequently reflect degrees of influence and the power distribution within an organization. Longer-tenured members of an organization can influence it through socialization processes. In an extensive clinical study on board-level decision making, Alderfer (1986) found that board members with long tenure shared a common understanding about their function as a special group as well as about the ways their companies operated. New board members, on the other hand, needed to learn about organizational practices before they could function properly. Often, new board members had to wait a year before making significant contributions. Similarly, Alderfer found that CEOs were likely to have more influence with boards later in their careers. Early in their careers, for example, CEOs had little influence in shaping their boards' memberships. Later on, they tended to appoint outside directors of their choice to their boards. In addition, Alderfer noted that as tenure increased, so did the chances that a CEO would experience high turnover among board members. Thus, CEO tenure vis-à-vis board members' tenures appeared to be a good proxy for CEO influence. Taking a managerialist view, we hypothesized:

Hypothesis 4: The longer the tenure of a top executive compared to that of outside directors, the greater the likelihood that a board will adopt golden parachutes.

Ownership Structure

The extent of top management's stock ownership reflects the degree of congruence between the interests of stockholders and those of top management. From an agency perspective, a high level of stock owned by top management will help align managerial and stockholder objectives, reducing the need for special compensation in the event of takeover, because gains in stock value are possible if a takeover bid is made for the firm. Knoebler (1986) also made this argument. Therefore,

Hypothesis 5: The higher the extent of management stock ownership, the lower the likelihood that a board will adopt golden parachutes.

A parallel argument is that stock not owned by management constrains management's ability to influence a board (Herman, 1981; Zald, 1969). The concentration of stock in the hands of a few outsiders gives them significant voting power that limits management influence on matters requiring board-level decisions. Furthermore, the implicit influence large stockholders exert on matters of top-executive compensation and executive control would become operational, decreasing the likelihood of the adoption of golden parachutes. Salancik and Pfeffer (1980) made an analogous argument in a study examining CEO succession in manager-controlled, owner-controlled, and outsider-controlled firms. This argument implies a high potential level of managerial discretion (Hambrick & Finkelstein, 1987) in firms with dispersed stock ownership. Therefore, consistent with a managerialist view,

Hypothesis 6: The higher the concentration of stock ownership in nonmanagement hands, the lower the likelihood that a board will adopt golden parachutes.

RESEARCH DESIGN

Data Collection

This research was based on data from 84 large public corporations from the Fortune 500 that had, according to proxy statements filed with the SEC, adopted golden parachutes as of December 1985. Since the focus of the research was the attributes of CEOs and boards in firms that had adopted golden parachutes, it was necessary to develop a control group of firms that had not done so. Following Larcker's (1983) study of the association between adoption of a performance plan and capital investment, we constructed a control group of firms that were (1) without golden parachutes for top executives, (2) in the same industry as the firms adopting golden parachutes (in the same two-digit Standard Industrial Classification group), and (3) of comparable size. We attempted to match each firm in our reference group to two control firms for those criteria and for fiscal year. The matching process resulted in an overall usable set of 213 firms, 79 of which had adopted golden parachutes and 134 of which had not. Out of the 79 golden parachute firms, 8 of them had adopted the pertinent contract before 1980; 23 had done so in 1981; 38 in 1982; and 10, in 1983. Table 2, which profiles the two groups, shows that they did not differ statistically in the year before the reference firms adopted golden parachutes in terms of their assets, sales, net incomes, returns on equity, R&D expenditures, and advertising expenditures.²

Data were collected from proxy statements on the size of firms' boards; their composition in terms of ratios of inside to outside directors; the ownership structure of the firms' stock, or the percentages owned by manage-

² A year-by-year comparison of the six variables in Table 2 for the last five years before adoption resulted in similar conclusions.

TABLE 2
Profiles of the Firms Studied^a

Variables	Firms Adopting Golden Parachutes ^b			Other Firms		F ^c	t ^c
	Means	s.d.	N	Means	s.d.		
ROE	11.93	9.45	120	14.01	10.15	1.15	1.38
Income	104.91	182.55	121	98.37	178.85	1.04	-0.24
Sales	2,277.37	2,927.66	122	1,677.26	2,515.17	1.35	-1.48
Assets	1,800.48	2,234.45	122	1,493.93	2,429.55	1.18	-0.85
R&D expenditures	1.62	2.00	106	1.34	2.38	1.42	-0.82
Advertising expenditures	1.35	2.48	117	1.17	2.27	1.20	-0.51

^a Data are for the year before golden parachute adoption or for the corresponding period for other firms.

The number of observations, *N*, indicates the number of firms for which data were available in the COMPUSTAT tapes. The loss of data is primarily due to the acquisition of certain firms, which were excluded from the COMPUSTAT database as of 1986.

^b *N* = 67.

^c None of the differences were significant.

ment and by investors with more than 5 percent; and CEO compensation (salaries and bonuses). We also recorded takeover attempts that had occurred up to one year before the adoption of a golden parachute contract, using two sources, 13D filings with the SEC and summarized articles from the *Wall Street Journal Index*. Using Standard and Poor's COMPUSTAT tapes, we collected data on return on equity and firms' sales and assets.

Measurements

The probability of adoption of a proposal to provide top management with golden parachutes, the dependent variable of our general model, was studied to obtain insights into the characteristics of management-board relationships in situations in which firms provide such contingent compensation. We coded the adoption variable binarily, with 1 for adoption and 0 for no adoption.

We measured takeover threat conservatively as actual transfer of ownership of more than 5 percent of the total stock of a firm to a potential acquirer and the filing of 13D statements with the SEC at least a year before acceptance of a golden parachute proposal. Since the SEC requires 13D filings to indicate the intent of any investor who has acquired more than 5 percent of a company's stock, the content of such filings is a clear measure of takeover threat. The variable was coded 1 if a company had experienced a takeover threat and 0 otherwise. We measured board characteristics in terms of board size and the percentage of outside directors. CEO influence was the ratio of a CEO's tenure to the average tenure of a firm's outside directors. The percentage of stock owned by a top management team was obtained from the proxy statement in the section discussing stock ownership

of officers and directors. The sum of all blocks of stock ownership greater than 5 percent measured the concentration of stock in nonmanagement hands.

Model Specification

The following model was specified for our study: Probability of adopting golden parachutes = f (takeover threat, board size, proportion of outside directors, CEO relative tenure, proportion of stocks owned by management team, cumulative blocks of shares owned by major nonmanagement shareholders, error term).

One of our interests was to see if the determinants of golden parachute adoption differed between firms that had had and successfully countered a prior takeover attempt and those that had not experienced such a threat. In the absence of clear takeover threats, how does a board function? Do takeover threats enhance or diminish management's influence on a board? To answer these questions, we conducted additional analyses by excluding firms that did not experience takeover threats.

In our analyses, we used a logistic function representing the general model, defined as $\log[P/(1 - P)] = \sum b_k X_k$, or $P = \exp(\sum b_k X_k) / [1 + \exp(\sum b_k X_k)]$, where P is the probability of adopting golden parachutes, X_k 's are covariates consisting of board characteristics, CEO influence, ownership structure, and takeover threats, and b_k 's are slope coefficients (estimated parameters). We considered this function superior to other alternatives with similar characteristics (Aldrich & Nelson, 1984). Logistic regression is particularly useful in binary choice models, in which explicit hypotheses about the signs of individual independent variables can be tested. We included cash compensation for outside directors as a control variable.

RESULTS

Tables 3 and 4 report the results of this research. Table 3 presents intercorrelations, means, and standard deviations. Table 4 presents the results of regression equations with the logistic transformation of the likelihood of adoption of golden parachutes as the dependent variable. Model 1 is the result of the equation for all firms studied, and model 2 represents an anal-

TABLE 3
Means, Standard Deviations, and Pearson Correlation Coefficients^a

Variables	Means	s.d.	1	2	3	4	5
1. Takeover attempts							
2. Size of board	11.78	3.48	-.03				
3. External directors	0.66	0.15	.10	.05			
4. CEO relative tenure	3.36	2.09	.06	.21	-.07		
5. Management-owned stock	8.82	13.11	-.06	-.14	-.25	.01	
6. Nonmanagement-owned stock	16.62	19.33	.07	.06	-.00	-.03	.08

^a For $r \geq .29$, $p < .05$; for $r \geq .38$, $p < .01$.

TABLE 4
Results of Logistic Regression Analysis^a

Variables	All Firms	Firms with No Takeover Attempts
	Model 1	Model 2
Nonmanagement-owned stock	-0.03** (2.59)	-0.03** (2.88)
Takeover attempts	0.68* (2.49)	
Board size	-0.02 (0.46)	-0.02 (0.35)
External directors	2.05† (1.69)	2.73* (2.07)
Pay to outside directors	-0.02 (0.90)	0.03 (1.18)
CEO tenure	0.09 (1.01)	0.17† (1.81)
Management-owned stock	-0.03† (1.81)	-0.04* (2.01)
Constant	-0.97 (0.82)	-2.31 (1.63)
Log-likelihood	-109.3	-101.8
Chi-square	218.9***	199.5***
R ^{2b}	0.50	0.49

^a Numbers in brackets are *t*-statistics.

^b See Aldrich and Nelson (1984: 57) for the method of computation. For logistic regression, R² should be interpreted with caution as there is debate about appropriate ways of calculating the percentage of variance explained. We provide this statistic in addition to the log-likelihood and chi-square, which are the appropriate statistics for logistic regression, to help readers get an intuitive estimate of goodness of fit.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

ysis of the same sets of variables for firms that had not experienced an explicit takeover threat.

In model 1, significant positive predictors of the adoption of golden parachutes are shares owned by groups other than management, a prior takeover attempt, and the percentage of external directors; the percentage of stock owned by management had a significant negative relationship with adoptions. The overall model has high goodness of fit, as indicated by the value of chi-square.

Prior takeover attempt and shares owned by nonmanagement are highly significant and in the hypothesized direction. Board size is in the expected direction but is not significant, suggesting that size does not strongly indicate the degree to which top management finds difficulty in influencing their board, as we hypothesized. One possible explanation is that the relationship between board size and CEO influence is nonlinear. CEOs may

easily exert their influence on small boards but find it difficult to influence large ones. However, when boards are beyond a certain size, small groups, or dominant coalitions, may tend to dominate them. As CEOs can be assumed to play significant roles in such coalitions, their potential influence is high.³ An alternative interpretation of this result is that board size is just not a significant determinant of board decisions. Other internal dynamics, such as group processes and interactions between insiders and outsiders (Alderfer, 1986), may be important, but we did not measure those dynamics in this study.

Contrary to our hypothesis but consistent with the findings of Cochran, Wood, and Jones (1985), firms that adopted golden parachutes had higher percentages of outside directors on their boards than firms that did not adopt golden parachutes. The results also show, however, that stock ownership by the management team has a significant negative relationship with golden parachute adoption, indicating that the ownership of stock could be a substitute for the takeover-contingent compensation that CEOs might otherwise negotiate into their contracts.

For the subset of firms excluding the 21 that had takeover attempts prior to the adoption of golden parachutes, the results indicate that all significant predictors of golden parachute adoption for the full set have a stronger effect. The purpose of performing this analysis is to control for the differential effect of a prior takeover attempt on decision making at the board level and then to examine whether the independent variables significantly distinguished between golden parachute adopters and non-adopters. The percentages of stock owned by management and by outsiders are significant negative predictors, and the proportion of outside directors is a significant positive predictor. CEO tenure relative to outside director tenure is also a significant positive predictor of golden parachute adoption. The results are also significant at a higher level, with some improvement in the goodness of fit and overall significance over model 1. Model 2 suggests that in firms that did not face an explicit takeover threat, a low concentration of stock ownership, low levels of managerial stock ownership, high CEO tenure, and a high percentage of outside directors provide a context conducive to golden parachute adoption.

Comparing the results obtained for all firms and for the unthreatened firms, we note similar results with different degrees of significance. The only variable that obtains significance in model 2 but not in model 1 is CEO tenure vis-à-vis outside board members' tenure. We argued that in the absence of takeover threats, CEO influence would prevail as a predictor of golden parachute adoption, and the significance of CEO tenure in model 2 supports that proposition. Results do not, however, support the proposition that insider-dominated boards will tend to adopt golden parachutes, even for the firms with no takeover threats.

³ We thank one of the reviewers for this interpretation.

Taken together, these results suggest that the interaction among the variables examined is complex. CEOs with high relative tenure who run corporations with diffused ownership tend to get golden parachutes, and a trade-off occurs, whereby managers with low stock ownership get compensation contingent on the event of takeover. The latter aligns top management's interests with those of their stockholders, who on the average stand to gain significantly from a takeover attempt.

The results show that boards with many outsiders tend to adopt golden parachutes. Since CEO tenure vis-à-vis that of outside directors is high in firms adopting golden parachutes, it seems that board composition alone does not fully capture the degree of a CEO's influence over a board. An alternative explanation for the significance of tenure is that it reflects organization-specific investment by CEOs, which boards recognize as a basis for compensation. Since this study did not focus on golden parachutes as reflecting organization-specific human-capital investment (Williamson, 1985), we did not have multiple surrogates for this variable. Furthermore, the pattern of relationships in these results suggests a need to consider ownership structure, particularly the concentration of stock outside the hands of management, as an important variable determining golden parachute adoption and perhaps other significant board-level decisions. In both the models, relative diffusion of stock ownership is a strong predictor of golden parachute adoption.

IMPLICATIONS

The adoption of golden parachutes has been the focus of much debate about whether managers should be compensated after a change in the control of a firm. There have been speculations that managers have influenced their boards into adopting these controversial compensation proposals and calls for reform in the composition of boards of directors. The findings of this research suggest that golden parachute adoption has occurred more often in firms with many outside directors, suggesting that concern with adding outsiders to corporate boards is misplaced. Activists seeking to add outsiders have presumed that the latter are objective and independent; our finding can be interpreted as refuting the basis of this activism. Other attributes of outside directors, such as professional relationships with the CEOs of the companies they direct, involvement in other contractual arrangements with the companies, or representation of institutional investors, rather than simple characteristics like size and inside-outside status, may shape board-management relationships.

The role of prior takeover attempts as a significant explanatory variable in golden parachute adoption provides additional insight. Since we defined takeover attempts conservatively, requiring a potential acquirer to own at least 5 percent of a firm's stock a year before golden parachute adoption, this result is a strong one. An objectively measurable takeover threat tends not only to enhance a management's need to adopt golden parachutes but also to

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provide an opportunity for management, regardless of tenure, to successfully negotiate such agreements.

The results suggest that in firms that have not faced an explicit takeover threat, an environment conducive to golden parachute adoption is one in which stock ownership is relatively diffused and the CEO has high tenure vis-à-vis that of board members. The diffusion of stock ownership was one of the main reasons for the increasing influence of managerialism (Berle & Means, 1934), because as stockholdings are diffused, the likelihood of coordinated action by stockholders declines. One possible area of stockholder activism is the threat of lawsuits, which requires some solidarity among shareholders. Furthermore, consistent with Alderfer's (1986) findings, CEO tenure vis-à-vis members' tenure appears to be an indicator of CEO influence. Whenever the two conditions, high diffusion of stock ownership and high CEO tenure, prevail, CEOs are likely to significantly influence board-management relationships. The presence of the two conditions indicates a high level of managerial discretion.

The results indicate that managerialist interpretations of manager-board relationships are appropriate in explaining golden parachute adoption in firms with diffused ownership structures and suggest that the theoretical linkage between board composition and board independence should be re-examined. A more complex interaction between ownership structure, relative tenure, and other proxies for the governance structure of publicly held corporations than has been previously tested would appear to be more useful in explaining the outcome of board-level interactions.

From an agency theory perspective, the results are consistent with Hypotheses 1 and 5, which state golden parachute adoption as a contingent compensation problem. A golden parachute can be viewed as a mechanism to align managerial interests with those of stockholders. The significant and positive coefficient for prior takeover attempts confirms a contingent-compensation perspective on golden parachutes. The results also suggest that a trade-off in interest alignment mechanisms occurs, whereby managers with relatively low levels of stock ownership seek compensation contingent on the event of takeover. However, the significance of board composition and the relative tenures of CEOs and outside directors suggest that those proxies for influence mechanisms can enrich the agency perspective on corporate governance.

The adoption of golden parachutes was chosen as the focus of this research in order to examine the interplay between boards and top management in making a type of decision that falls squarely within the purview of boards: decisions regarding top executive compensation in the face of a potential change in control. Seemingly controversial decisions to adopt golden parachutes appear to be outcomes of CEO tenure, board characteristics, ownership structure, and a history of prior takeover attempts. In particular, the results of this study point to ownership structure and CEO tenure as factors that materially affect board-level decisions. Although this study provides some insights into golden parachute adoption, more research is required to examine the merit of interpreting golden parachute contracts as

reflecting top management's organization-specific investment and their employment opportunities. Further research is also needed to document the consequences of golden parachutes: do they change the behavior of top managers facing takeover bids? Do golden parachutes deter or enhance takeover attempts? The findings of this study suggest the need to research the relationships between management, boards of directors, and ownership structure, especially those that exist when control of a firm is threatened.

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Harbir Singh is an associate professor of management at the Wharton School of Business, University of Pennsylvania. He received his doctorate in business administration from the University of Michigan. He has conducted research on corporate acquisition strategies, on the determinants of choice between acquisition and joint venture as alternative modes of corporate growth, and on top-management incentive compensation.

Farid Harianto is a doctoral candidate in strategic management at the Wharton School of Business, University of Pennsylvania. He is currently finishing a dissertation examining technological innovation as an interfirm phenomenon in the information service industry. His research interests include corporate governance, interfirm linkages, and the role of innovation in strategy.

EFFECTS OF OWNERSHIP STRUCTURE AND CONTROL ON CORPORATE PRODUCTIVITY

CHARLES W. L. HILL

University of Washington

SCOTT A. SNELL

Pennsylvania State University

This study developed and tested a model that attempts to describe the influence of ownership structure on productivity differences between firms. We theorized that diversification, investment in R&D, capital intensity, and ownership structure all determine firm productivity. Ownership structure was proposed to affect productivity both directly and indirectly through the mediators of diversification strategy, R&D expenditure, and capital intensity. Results based on data from a cross-sectional set of 122 *Fortune* 500 firms suggested that ownership affects a firm's posture toward diversification and investment in R&D. Those factors and capital intensity in turn explain differences in productivity between firms.

Ever since Berle and Means (1932) published their seminal thesis on the divorce of ownership and control, there has been a vigorous debate on the importance that the distribution of stock ownership has for firms. Some authors, following Berle and Means, have argued that the distribution of ownership has important implications for the efficiency and strategic development of firms (Galbraith, 1967; Marris, 1964; Pfeffer & Salancik, 1978; Williamson, 1964). Others have argued that the distribution of ownership is irrelevant (Demsetz, 1983; Demsetz & Lehn, 1985; Fama, 1983; Jensen & Meckling, 1976). Research on this issue has yielded conflicting results (Cubbin & Leech, 1983). In part, the reason appears to be the problems with data that face researchers attempting to construct meaningful measures of the distribution of stock ownership (Cubbin & Leech, 1983).

Drawing on uniquely rich data on stock ownership published one time only by Corporate Data Exchange, the current study addressed the question, how does ownership structure affect the efficiency and strategic development of a firm? Our position is similar to that taken by Salancik and Pfeffer: "Ownership represents a source of power that can be used either to support or oppose management, depending on how it is concentrated and used. In general, the more concentrated ownership is the more potent potential sup-

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port or opposition" (Salancik & Pfeffer, 1980: 655). We theorized that owners seek to maximize their return on investment. Maximization of the efficiency of a firm is the best way to achieve this. Owners will support strategies perceived as maximizing efficiency and oppose strategies perceived as having a detrimental effect on efficiency. The strategies that we focused on are diversification and investment in R&D.

Unlike prior studies (e.g., Demsetz & Lehn, 1985; Holl, 1975; Lawriwsky, 1984; Monsen, Chiu, & Cooley, 1968), we measured efficiency by productivity rather than profitability, in part because there are grounds for believing the former to be a less ambiguous measure of efficiency than the latter. Beyond this, arguments that the need for productivity improvement may be one of the most pressing problems facing the United States economy motivated our choice (Hayes & Abernathy, 1980; Hill, Hitt, & Hoskisson, 1988; Thurrow, 1985). By focusing on the role of ownership structure and strategy as determinants of productivity, this research may help identify strategies that improve productivity.

THEORETICAL FRAMEWORK

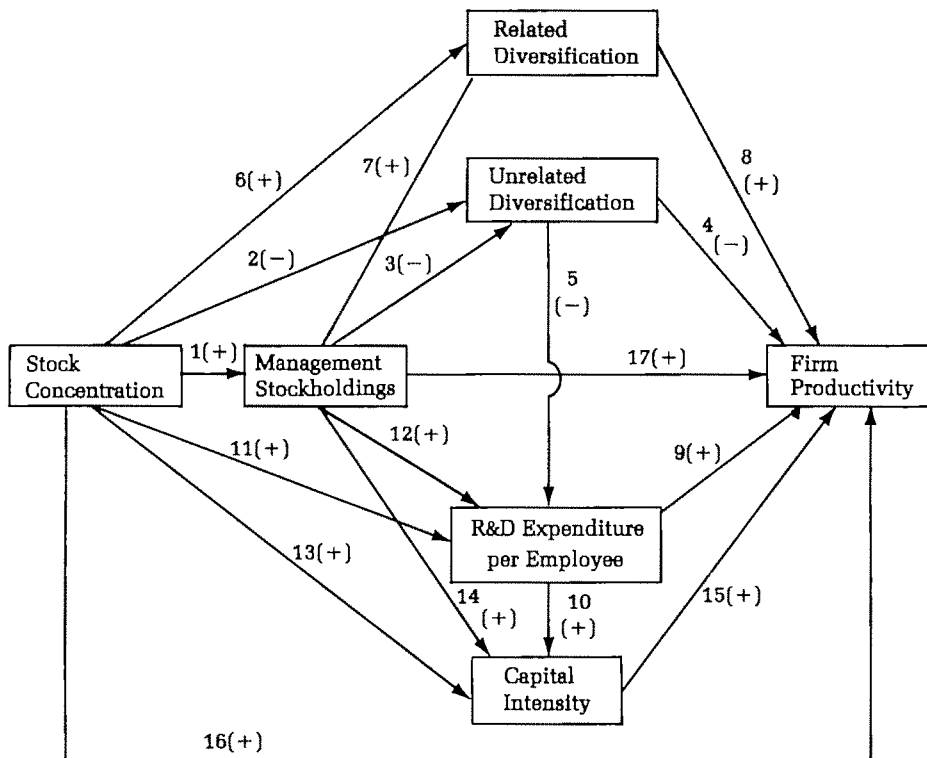
Figure 1 illustrates our model. Each line represents a research hypothesis. The concentration of stockholdings, our measure of ownership structure, is shown as influencing productivity both directly and indirectly, through the mediators of diversification strategy, management stockholdings, R&D expenditures, and capital intensity.

Underlying Assumptions

Two assumptions underlie Figure 1; the first is that the interests of managers and stockholders diverge. This assumption is grounded in the literature on managerial discretion, in which authors have theorized that stockholders are wealth maximizers but that managers maximize a utility function that has remuneration, power, security, and status as its central elements (Galbraith, 1967; Marris, 1964; Williamson, 1964). Satisfying stockholders' interests requires the maximization of efficiency, but satisfying management interests requires the maximization of firm size and diversity (Aoki, 1984). Moreover, according to this literature, a trade-off exists between maximizing firm size and diversity and maximizing efficiency. Past some point, the greater the investment in size and diversity, the lower the investment in efficiency. Thus, firms acting in the interests of their owners should be characterized by greater efficiency than firms acting to maximize management utility.

The model's second assumption is that the efficiency of the capital market as a disciplinary device varies systematically across firms depending on level of stock concentration. This view conflicts with agency theory, according to which stock concentration is irrelevant (Demsetz, 1983; Demsetz & Lehn, 1985; Fama, 1983; Jensen & Meckling, 1976) and the market is universally efficient. By proposing that stock concentration matters, we are

FIGURE 1
Research Model^a



^a The number for each path corresponds with its specific hypothesis in the text.

taking a position opposed to the notion of universal market efficiency. Our theory is closely aligned with the work of Berle and Means (1932). Thus, at one level of abstraction, the research model set out in Figure 1 is a test of agency theory. If agency theory is correct, we should fail to observe any relationships between stock concentration and the other variables shown in the figure. If the efficiency of the market varies between firms in a systematic way, depending on the level of their stock concentration, we would expect to find support for at least some of the relationships sketched out in Figure 1.

Why Stock Concentration Matters

The efficiency of the stock market depends on two factors. The first is the quality of the information at its disposal (Fama, 1970). If information asymmetries exist between managers and stockholders, stockholders may lack the data necessary to pass judgment on the desirability of certain strategies. They may be unable to know when management is acting in their interests. This inability gives managers leeway to pursue strategies that are

not in stockholders' best interests (Williamson, 1975). Second, the efficiency of the stock market also depends on the ability of stockholders to remove managers that fail to maximize stockholder wealth by waging proxy battles or engineering takeover bids (Manne, 1965). Both those abilities are a function of stock concentration.

When stockholdings are concentrated, it is relatively easy for individual stockholders to coordinate action and demand information from management, thereby overcoming information asymmetries (Berle & Means, 1932). Stockholders commanding significant blocks of shares can use their voting power, the threat to vote, or the threat to sell to demand an accounting from management and influence management decisions (Aoki, 1984; Leech, 1987; Salancik & Pfeffer, 1980). Recognizing the ability of powerful stockholders to wage a proxy battle or precipitate a takeover through sale of their stock, managers are likely to take such threats seriously.¹ Thus, when stockholdings are concentrated, information asymmetries are low, the ability of stockholders to remove a management team is high, and managers are likely to feel constrained to pursue strategies that are in stockholders' interests.

In contrast, when stockholdings are diffused, it is difficult for individual stockholders to coordinate action and demand an accounting from management (Aoki, 1984; Berle & Means, 1932; Leech, 1987; Salancik & Pfeffer, 1980). Thus, significant information asymmetries are likely to exist, giving managers leeway to pursue strategies inconsistent with stockholder interests (Marris, 1964; Williamson, 1975). Moreover, even if individual stockholders should conclude that management is not acting in their interests, they may lack the resources to wage a proxy battle or the ability to engineer a takeover. Of course, even when stockholdings are diffused, if enough stockholders disagree with management policies and sell out, a stock price will fall, making the firm a takeover target. However, the existence of information asymmetries makes such collective agreement likely only in extreme cases (Williamson, 1975).²

Management Stockholdings

Even when stockholdings are diffused, stock-based compensation schemes may serve to align the interests of managers and stockholders (Demsetz, 1983; Lewellen, Loderer, & Rosenfeld, 1985). Put simply, when managers are themselves significant stockholders, they are more likely to make decisions consistent with maximizing stockholder wealth, since that will maximize their own income and wealth. We concur, but theorize that the

¹ The costs of waging a proxy battle, estimated to average \$1.7 million (Cowan, 1988), are so high that in reality, only coalitions of powerful stockholders can afford such a battle.

² Agency theorists might counter that when stockholdings are diffused, a firm's board of directors acts as the guardian of stockholder interests (Fama & Jensen, 1983). However, this argument ignores evidence suggesting that top management both selects and dominates boards (Mace, 1971; Pfeffer, 1972). Thus, when stockholdings are diffused, there are grounds for believing that a board will act as a poor guardian of stockholder interests.

introduction of stock-based compensation schemes is precipitated by powerful stockholders seeking to align management and stockholder interests. Stockholders, perceiving stock-based compensation schemes to be in their interest, will actively promote their adoption. Other things being equal, the more powerful the stockholders, the greater their ability to achieve this end. Given a choice, managers may prefer not to receive compensation in the form of stockholdings, since the cyclicalities of market prices introduces an undesirable volatility into their own income streams.

Hypothesis 1: There will be a positive relationship between stock concentration and a firm's level of management stockholdings.

Other incentive compensation schemes, not linked to stock, may also serve to align the interests of management and stockholders, but consideration of such schemes was beyond the scope of the current study. We maintain that our focus on management stockholdings is justified. If a firm's stock price reflects its future value, as theory suggests, linking management compensation to stock prices ensures that management actions are in the long-run interests of stockholders. In contrast, other incentive schemes, such as those based on annual profit bonuses, may have the disadvantage of focusing managers' attention on short-run performance.

Ownership Structure, Diversification, and Productivity

Previous researchers have theorized that extensive diversification into unrelated businesses is the best way for managers to maximize the size of a firm, which enables them to satisfy desires for high remuneration, power, security, and status (Marris, 1964; Mueller, 1969, 1977). Unrelated diversification also enables managers to diversify their own employment risk, thus maximizing job security (Amihud & Lev, 1981). Theory suggests that when pursuing unrelated diversification, managers trade efficiency for an increase in firm size and a decrease in operating risks (Marris, 1964). There is empirical support for this proposition. Unrelated diversification has been associated with lower economic return (Christensen & Montgomery, 1981; Rumelt, 1974, 1982), and lower risk (Amit & Livnat, 1988; Bettis & Mahajan, 1985) than related diversification.

In contrast, as stockholders can diversify their own portfolios more quickly and at a lower cost than a firm can, they have little to gain from the risk-reducing aspects of extensive unrelated diversification (Levy & Sarnet, 1970). Stockholders may disapprove of unrelated diversification, as it absorbs resources that might otherwise be devoted to investments in maximizing productive efficiency, such as investment in R&D, or in pursuing strategies consistent with maximizing stockholder wealth, such as related diversification or stock buy-backs. In addition, Hayes and Abernathy (1980) argued that a preoccupation with extensive diversification diverts attention from the painstaking work necessary to maximize productivity in a firm's primary industry. Similarly, Hill and colleagues (1988) argued that extensive

diversification fosters a short-run orientation within a firm that inhibits investment in R&D.

In sum, these arguments suggest that stockholders will disapprove of unrelated diversification. In addition, when managers are themselves significant stockholders, they will avoid unrelated diversification, since pursuit of that strategy is inconsistent with the maximization of their own income and wealth. Thus,

Hypothesis 2: There will be a negative relationship between stock concentration and unrelated diversification.

Hypothesis 3: There will be a negative relationship between the extent of management stockholdings and unrelated diversification.

Hypothesis 4: There will be a negative relationship between unrelated diversification and firm productivity.

Hypothesis 5: There will be a negative relationship between unrelated diversification and investment in R&D.

These arguments do not apply to related diversification. The literature on strategy suggests that related diversification is associated with superior economic performance (Bettis, 1981; Christensen & Montgomery, 1981; Rumelt, 1974, 1982) arising from skill transfers and from resource sharing that enables economies of scope (Porter, 1987; Teece, 1980). So long as a firm adopts the appropriate structure and control systems, skill transfers and resource sharing will lead to the more efficient utilization of resources, increasing firm productivity (Hill & Hoskisson, 1987). Thus, related diversification may be in stockholders' best interests. Prior arguments, however, suggest that managers prefer unrelated diversification because it reduces risk better than does related diversification.

Hypothesis 6: There will be a positive relationship between stock concentration and related diversification.

Hypothesis 7: There will be a positive relationship between the extent of management stockholdings and related diversification.

Hypothesis 8: There will be a positive relationship between related diversification and firm productivity.

Ownership Structure, R&D Expenditure, and Productivity

Prior research suggests that R&D expenditure affects productivity through its impact on product and process innovations (Griliches, 1986; Mansfield, Schwartz, & Wagner, 1980; Nelson, 1981; Scherer, 1984). Thus, we expected to observe a positive relationship between R&D intensity and productivity. In addition, as new process innovations tend to result in a substitution of capital for labor (Scherer, 1984), we also expected to observe a positive relationship between R&D intensity and capital intensity. Thus,

Hypothesis 9: There will be a positive relationship between R&D intensity and productivity.

Hypothesis 10: There will be a positive relationship between R&D intensity and capital intensity.

Investment in R&D is a high risk—high return strategy (Mansfield, 1969). The high return comes from the high profits that successful innovations typically generate. The high risk comes from the high failure rate of innovations—previous research estimated that 80–88 percent of innovations fail to generate an adequate long-term return on investment (Mansfield, 1969). Significant investment in R&D may be in the best interests of stockholders, who benefit from the high return on successful innovations and can attenuate the impact of failure by diversifying their own portfolios. It is less attractive to risk-averse managers, who have to bear the consequences of failure. Thus, unless they are themselves significant stockholders, managers might favor the low R&D intensity consistent with the lower risks and returns of an imitation strategy, and stockholders might favor the high R&D intensity of an innovation strategy.³ Given resource constraints, managers prefer to invest less in R&D, since they seek merely to imitate the innovations of others, and to invest more in strategies that are in their interests, such as unrelated diversification (as suggested in Hypothesis 5). Thus,

Hypothesis 11: There will be a positive relationship between stock concentration and R&D intensity.

Hypothesis 12: There will be a positive relationship between the extent of management stockholdings and R&D intensity.

These hypotheses may initially seem contrary to a view expressed in previous research (Graves, 1988; Hill et al., 1988). Those authors have suggested that stock-shuttling by investors in response to quarterly earnings statements produces a volatile market for a firm's stock, increases the risk of raiders' mounting a hostile takeover bid, and consequently forces managers to focus on short-run profits and cut investments aimed at maintaining competitiveness, including investments in R&D.

On closer examination, this view supports Hypotheses 11 and 12. Short-term stock-shuttling is not a practical option when stockholdings are concentrated, with individual stockholders owning large blocks of shares in a firm. The loss taken on selling large blocks of shares is too high for stockholders to contemplate such an action merely in response to quarterly earnings statements (Aoki, 1984; Leech, 1987). Major stockholders are more likely to take a long-term view of a firm's strategy and use voice and the threat of exit to encourage investments in long-term efficiency, including R&D. Alternatively, when stockholdings are diffused, the costs of exit to

³ On this point, Mansfield and colleagues (1980) found that, on the average, imitators could duplicate patented innovations for about 65 percent of the innovators' R&D costs, although the returns to imitation were lower than the returns to innovation.

individual stockholders are less pronounced. Thus, stock-shuttling becomes an option, and management may be forced to focus on short-run profits and cut investments in R&D aimed at maintaining long-run efficiency.

Ownership Structure, Capital Intensity, and Productivity

Capital intensity refers to a firm's ratio of capital to labor. Prior work, particularly research based on the Profit Impact of Market Strategy (PIMS) data base, has suggested that, after industry effects have been controlled for, the more capital available for each unit of labor, the greater the productivity of that labor and of the employing firm (Buzzell & Gale, 1987; Freeman & Medoff, 1979; Gale, 1980).

Ownership structure may affect capital intensity through management preferences for investing resources in excess staff. Investments in excess staff are consistent with maximizing a managerial utility function that contains power, security, and status as its key elements (Williamson, 1964). Managers may derive status and power from controlling a large staff. They tend to invest resources in staff over and above the level required for the efficient operation of a firm or over what would be judged to be an optimal level of organizational slack (Bourgeois, 1981). Such discretionary investment is not in stockholders' interests, since it has little to do with efficiency. The implication is that when management dominates, a firm is more labor-intensive than capital-intensive, and productivity is lower than when stockholders dominate, except, of course, when managers are themselves significant stockholders. Thus,

Hypothesis 13: There will be a positive relationship between stock concentration and capital intensity.

Hypothesis 14: There will be a positive relationship between the extent of management stockholdings and capital intensity.

Hypothesis 15: Capital intensity will be positively related to productivity.

Ownership Structure, X-Efficiency, and Productivity

Leibenstein (1966, 1979) cited evidence suggesting that otherwise identical firms can have different levels of productivity. He referred to the gap between a firm's actual productivity and the level that could be achieved without any change in the investment structure of a firm as X-inefficiency. A firm is said to be X-efficient when its level of X-inefficiency is zero.

According to Leibenstein, the degree of X-inefficiency in a firm depends on the motivation of both managers and workers. Leibenstein theorized that if allowed to, individuals are likely to choose a working position that is not the most productive for a firm but that maximizes their own utility. That is,

they have a tendency to shirk or free ride (Alchain & Demsetz, 1972).⁴ Leibenstein argued that the ability of individuals to shirk or free ride depends in part on the pressure that external stakeholders place on a firm to maximize efficiency.⁵ In this context, a firm's stockholders are among its most important external stakeholders. It follows that the greater the concentration of stockholdings, the more likely it is that stockholders will be able to pressure employees to choose a working position that is the most productive for a firm. Powerful stockholders should be able to limit shirking by management and workers. In addition, when managers are themselves significant stockholders, they have an added incentive not to shirk. Thus,

Hypothesis 16: There will be a positive relationship between stock concentration and productivity.

Hypothesis 17: There will be a positive relationship between management stockholdings and productivity.

METHODS

Our hypotheses suggest that ownership structure affects productivity directly through the effects of powerful stockholders on the internal efficiency (or X-efficiency) of a firm. They also suggest that ownership structure affects productivity indirectly through the impact of stockholder preferences on diversification strategy, R&D expenditure, and capital intensity. When both direct and indirect effects are postulated within the framework of a causal model, the model is referred to as a partial mediation model, and path analysis is the appropriate analytical strategy (James & Brett, 1984).

Dependent Variable and Data

A commonly used measure of productivity is value added per employee (Buzzell & Gale, 1987; Gale, 1980; Guth, 1984). Value added is derived from summing employment costs, capital costs (depreciation provision and interest payments), and pretax income (Guth, 1984). In this study, *value added* = (pretax income + capital costs + employment costs)/number of employees. Value added per employee constitutes a more accurate measure of efficiency than the profit ratios used in prior ownership studies. The numerator of most profit ratios is based on pretax income remaining after capital costs. This figure is sensitive to the choice of a depreciation policy, which depends on bookkeeping convention and can materially affect the value of pretax income, thereby inflating or deflating a firm's profit ratio (Hay & Morris, 1979).

⁴ This does not mean that they will always free ride or shirk, but it implies that the potential is there.

⁵ It also depends on the intensity of product-market competition and on the tightness of the labor market for the services of managers and workers. Both those factors are largely industry-specific. By controlling for industry differences in productivity (see the Methods section), we factored out those effects.

By adding back capital costs and employment costs, value added presents a measure of the value created by a firm that is relatively uncorrupted by choice of accounting convention. Differences in accounting conventions can also confound the denominator of a profit ratio. In inflationary periods, a firm's estimate of assets or net worth may be artificially deflated if it relies on historic estimates. In turn, that deflation can artificially inflate profit ratios. Because neither inflation nor any accounting convention affects the numbers employed, value added per employee provides a less ambiguous measure of efficiency than profit ratios.

Most companies do not routinely report employment costs on their 10K forms, making computation of value added difficult. Athanasopoulos (1981) found that fewer than one quarter of *Fortune* 500 companies reported employment costs between 1978 and 1980. In a study aimed at establishing the value added per employee of the *Fortune* 500, Athanasopoulos polled those companies, requesting details of their employment costs. Using this data, he was able to identify the value added per employee of 216 of the *Fortune* 500 firms for 1978–80. We used Athanasopoulos's estimates for 1980 as the basis for the dependent variable in this study.

If a measure of productivity is to be meaningful, industry differences must be controlled for. To achieve this, Athanasopoulos grouped the firms in his study into industries according to *Fortune's* criterion, membership in a two-digit Standard Industrial Classification (SIC). Each firm was classified into its most important industry on the basis of 1980 revenues. He calculated the mean productivity for each industry and expressed each firm's productivity as an index number, with a score of 100 as the mean. For example, if a firm's value added per employee was 50 percent of the average for its primary industry, its index score was 50. We used this productivity index in this study. By factoring out industry differences, Athanasopoulos also factored out the impact of industry concentration, growth, and profitability on productivity.

The limitation of this approach is that it only approximately controls for the effects of industry specific factors for firms that have substantial activities based outside their primary industry. However, according to the COMPUSTAT data base, the firms in our study generated an average 80.3 percent of their revenues in their primary two-digit industry. Overall, 72 percent of the firms generated 70 percent or more of their sales in their primary industry, and only 10.6 percent generated less than 50 percent in their primary industry. These figures suggest that for the group as a whole, the problem was not serious, although for some firms control industry only represented an approximation. However, in the absence of a detailed industry-by-industry breakdown of productivity, such an approximation is the best that can be achieved. It is also consistent with the current practice in research (e.g., Fiegenbaum & Thomas, 1988).

Availability of information on the dependent variable, value added per employee, limited the potential set of firms for study to members of the *Fortune* 500. To get reliable estimates of industry means, we selected firms

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from industries that had at least ten members whose level of productivity could be identified. The industries selected and the number of firms in each were chemicals, 15; electrical equipment, 11; food, 21; industrial and farm equipment, 17; metal manufacturers, 18; paper and wood products, 19; and petroleum refining, 21. In total, the study included 122 firms.

To determine how representative of the *Fortune* 500 the 122 firms were, we calculated the 1980 return on equity (ROE) for both the 378 *Fortune* 500 firms not included and the 122 firms studied. Although there was a small difference between the mean ROEs of the two groups—15.28 percent for the 122 firms against 14.68 percent for the remainder—the difference was not significant ($t = .34$), suggesting that our group was adequately representative.

Ownership Structure

One weakness of prior studies on ownership structure is that they have used a single dichotomous variable, contrasting owner control and management control, defined on the basis of some arbitrary statistical criterion for size of controlling stockholding (Gomez-Mejia, Tosi, & Hinkin, 1987; Holl, 1975; Lawriwsky, 1984; Monsen et al., 1968). Some studies have defined a controlling stockholding as 5 percent, some as 10 percent, and some as 15 percent. Such a simplistic variable tells us nothing about the size distribution of stockholdings (Cubbin & Leech, 1983). The use of such a variable reflects the lack of public data on stockholdings.

To construct a measure of stock concentration that captured the distribution of the sizes of stockholdings, this study drew on unusually rich data assembled one time only by Corporate Data Exchange. The data are on the *Fortune* 500 in 1980. This data set details the percentage of common voting stock held in blocks of 0.2 percent and more. Using this data, we computed the logarithmic transformation of a Herfindahl measure⁶ of stock concentration, $\ln \sum_{i=1}^n S_i^2$, where S_i is the share of the i th stockholder and n is the number of stockholders with holdings of 0.2 percent or greater. The measure is identical to that used by Demsetz and Lehn (1985), the only prior study that has drawn on this data base.

Data on management stockholdings are publicly available. Management stockholdings were measured by the natural logarithm of the percentage of common voting stock held by management in 1980. We collected data on management stockholdings from the 1980 Computer Directions Advisors publication *Spectrum 6: Insider Holdings*.

⁶ Developed initially for use in studies of industry concentration, the Herfindahl measure takes into account both the number of stockholders in a firm and the differences in the size of their holdings. The value of the index will increase when there are few stockholders and/or greater degrees of inequality in the size of holdings. For details of the properties of this measure see Hay and Morris (1979), especially chapter 3.

Diversification

Our argument is that the more extensive and unrelated the diversification strategy of a firm, the lower its productivity. Following the product count method used in the industrial organization literature, we measured the extent of unrelated diversification by the number of two-digit SIC industries outside its primary two-digit industry that a firm was active in during 1980. Related diversification was measured by the number of four-digit SIC industries within its main two-digit industry that a firm was active in during 1980. Data were collected from Dun and Bradstreet's *Reference Book of Corporate Management*.

These measures capture the extent of a firm's diversity both outside and within its primary industry. Although not all of a firm's diversification outside its primary two-digit industry is necessarily unrelated to its core skills, we submit that the greater the extent of a firm's involvement in activities outside its primary two-digit industry, the more likely it is that some are unrelated to the firm's core skills. Similarly, we submit that diversification within a firm's primary two-digit industry tends to have the most potential to allow a firm to realize economic benefits from resource sharing or skill transfers and is thus most likely to be associated with superior productivity.

SIC-based measures have two advantages over the categorical measures devised by Rumelt (1974) and found in much of the strategy literature. First, they allow for the computation of continuous measures of diversification that more accurately reflect differences in the extent of diversification between firms. Second, SIC measures avoid the subjectivity associated with classifying firms on the basis of Rumelt's categories (Montgomery, 1982).

The drawback is that SIC-based measures lose some of the richness of Rumelt's categories. Although this is a limitation, it may not be a serious one. Montgomery (1982) presented evidence that suggests a high degree of convergence between SIC measures and Rumelt's (1974) categories. To check for convergence, we classified the firms in our data set into Rumelt's five main diversification categories: single, dominant, related-constrained, related-linked, and unrelated. We then performed an ANOVA to determine whether the SIC measures varied in a meaningful way across categories. The results, presented in Table 1, suggest that the SIC measures capture the essential differences between diversification categories. For example, while related-constrained businesses were based in 3.05 two-digit industries on the average, unrelated firms were based in 9.08 two-digit industries. Related-constrained firms were also involved in more four-digit industries within their primary two-digit industry than any other category. This pattern is consistent with the idea that related-constrained firms diversify into areas close to their core businesses.

Capital Intensity

Capital intensity was measured by the ratio of capital to labor in a firm, computed on the basis of COMPUSTAT data for 1980. We adjusted the raw

TABLE 1
Results of ANOVA Comparing SIC Measures of Diversification
and Rumelt's Categories^a

Rumelt Category	N	Mean Scores	
		Unrelated Diversification	Related Diversification
Single	8	1.38	1.75
Dominant	38	2.08	2.66
Related-constrained	39	3.05	5.00
Related-linked	25	4.32	4.72
Unrelated	12	9.08	4.00
F		15.50***	6.84***

^a Categories are from Rumelt (1974).

*** $p < .001$

capital-to-labor ratio for industry differences in capital intensity by standardizing the measure for each industry. The formula was $\text{capital/labor}_{ij} = (CL_{ij} - CL_j)/SD_j$, where CL_{ij} was the capital-to-labor ratio for firm i in industry j , CL_j was the mean capital-to-labor ratio for all firms in industry j , and SD_j was the standard deviation for the firms in industry j .

Research and Development

R&D expenditure per employee for 1979–81 was the measure used. R&D expenditure per employee is one of the better proxies for innovation. Another measure often used, R&D expenditure as a percentage of sales, is prone to greater distortions (Hay & Morris, 1979; Scherer, 1984) as it can fluctuate significantly from year to year in response to short-term cyclical fluctuations in revenues. As number employed tends to exhibit less short-term variability, it is a more reliable denominator for estimating a firm's long-run commitment to R&D and innovation.

R&D data were drawn from the COMPUSTAT tapes. We adjusted the measure for industry differences in R&D intensity by standardizing it for each industry. The formula was $R\&D_{ij} = (RD_{ij} - RD_j)/SD_j$, where RD_{ij} was the expenditure per employee for firm i in industry j , RD_j was the mean R&D expenditure per employee for all firms in industry j , and SD_j was the standard deviation for all firms in industry j .

Firms are not obliged to report R&D expenditures on their 10K forms, so unfortunately R&D data were available for only 81 of the 122 firms studied. Given the large number of missing observations, the initial analysis tested two models: one with R&D ($N = 81$) and one without R&D ($N = 122$).

The drawback of using R&D expenditure per employee is that the number of employees appears in the denominator of both this measure and the measure of productivity. However, we ran the initial analysis using both R&D expenditure per employee and R&D expenditure as a percentage of

sales. The correlation between the two was .83, which is similar to the correlation reported by studies that have used both measures (Graves, 1988). Moreover, the pattern of correlations with all other variables was similar for both measures. The main differences were that the correlation between R&D expenditure per employee and stock concentration was slightly lower than that between R&D as a percentage of sales and stock concentration, and the correlation between R&D per employee and productivity was slightly higher. Those differences were minor and had no substantive impact on significance levels.

RESULTS

Table 2 give means, standard deviations, and correlations for all variables. The analysis involved two steps. The first was a test, using regression techniques, for the effects of all the independent variables on productivity. The second involved the use of path analysis to test for the direct and indirect effects of ownership structure on productivity.

Regression Model

Table 3 reports the results of the tests for the determinants of productivity differences between firms. The results of two regression equations are reported, one for all the independent variables ($N = 81$) and one for all the variables except R&D expenditure ($N = 122$). We employed hierarchical regression analysis. Following the causal model set out in Figure 1, we entered the diversification variables, capital intensity, and R&D expenditure first in no predetermined order. Next, management stockholdings were added, and finally, the Herfindahl measure of stock concentration. Thus, the

TABLE 2
Means, Standard Deviations, and Correlations^a

Variables	Means	s.d.	1	2	3	4	5	6
1. Stock concentration	4.89	1.03						
2. Management stockholdings	1.10	1.50	.34***					
3. Capital-to-labor ratio	0.00	1.00	.06	.12				
4. R&D expenditure per employee	0.00	1.00	.24**	.05	.28**			
5. Unrelated diversification	4.93	6.46	-.28***	-.10	.15	-.18		
6. Related diversification	3.90	2.64	.12	.10	.04	-.15	.28**	
7. Productivity	100.60	33.20	.36***	.25***	.75***	.42***	-.40***	.12

^a $N = 122$ except for R&D expenditure, where $N = 81$.

** $p < .01$

*** $p < .001$

TABLE 3
Results of Regression Analysis^a

Independent Variables	R&D Expenditures Included			R&D Expenditures Excluded		
	Productivity	ΔR^2	F^b	Productivity	ΔR^2	F
Capital-to-labor ratio	0.49*** (0.07)	.34	39.94***	0.57*** (0.07)	.39	69.39***
Unrelated diversification	-0.32*** (0.08)	.14	21.07***	-0.30*** (0.07)	.09	17.64***
Related diversification	0.14† (0.07)	.03	5.06*	0.17* (0.07)	.04	7.84**
R&D expenditure per employee	0.25*** (0.07)	.05	7.73**			
Management stockholdings	0.12 (0.07)	.04	7.51**	0.09 (0.07)	.03	6.00*
Stock concentration	0.27*** (0.08)	.06	12.53***	0.22** (0.07)	.04	9.92**
R^2	0.65			0.58		
Adjusted R^2	0.63			0.56		
F	23.25***			28.65***		
N	81			122		

^a Standardized beta weights are reported; standard errors are in parentheses.

^b This F statistic refers to the change in R^2 attributable to each variable.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 4
Initial Path Coefficients

Variables	1	2	3	4	5	6
1. Stock concentration						
2. Management stockholdings	.33***					
3. Capital-to-labor ratio	.08	.07				
4. R&D expenditure per employee	.20†	.09	.28*			
5. Unrelated diversification	-.28*	-.02		-.14		
6. Related diversification	.04	.03				
7. Productivity	.27***	.12	.49***	.25***	-.32***	.14†

† $p < .10$

* $p < .05$

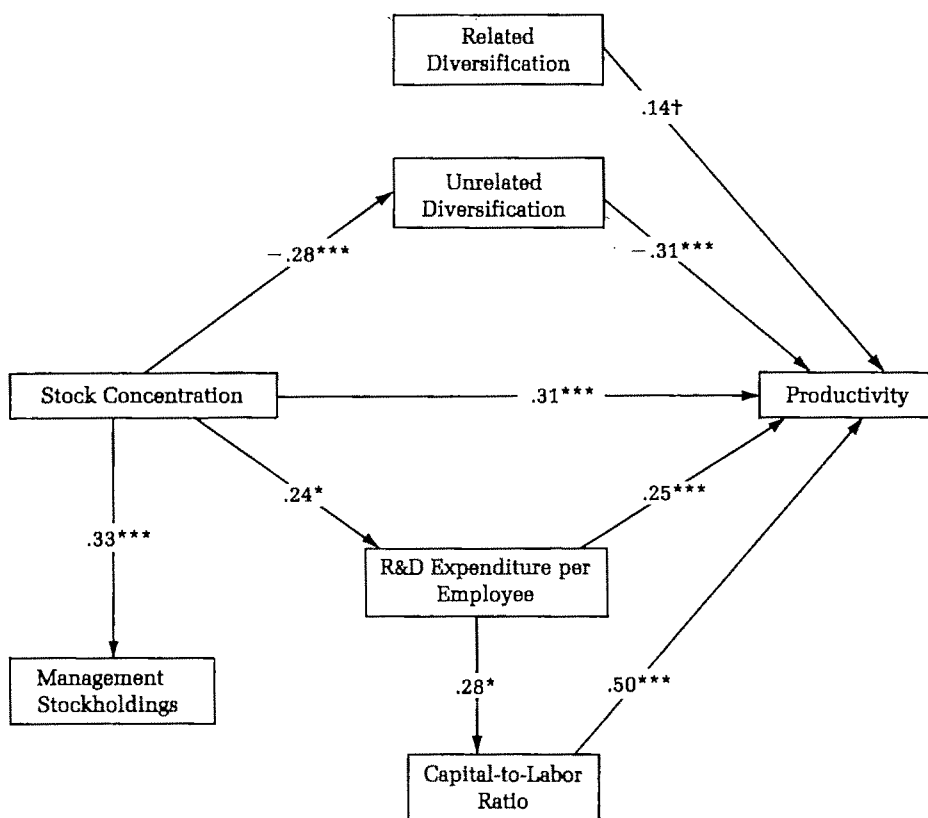
** $p < .01$

*** $p < .001$

stock concentration variable picked up variance not captured by the other independent variables.

The results of both equations were significant and explained a satisfactory amount of variance. The signs were as expected. All the variables accounted for a significant increase in the total R^2 at the 5 percent acceptance

FIGURE 2
Final Partial Mediation Model



$^\dagger p < .10$

$^* p < .05$

$^{**} p < .01$

$^{***} p < .001$

level or better when entered into the equations. Once the Herfindahl measure of stock concentration was entered into the equations, the coefficient for management stockholdings became insignificant. This may have occurred because the management stockholdings and stock concentration variables shared variance explained in the dependent variable.

Path Analysis

Path analysis was used to test the partial mediation model set out in Figure 1. We derived initial path coefficients by regressing each variable on all prior variables in the model. For this model, $N = 81$, since R&D data were included in the analysis. Table 4 shows the initial path coefficients. Following the theory-trimming approach to path analysis suggested by James, Mulaik, and Brett (1982), we assumed coefficients not significant at

TABLE 5
Decomposition Table for Final Path Model

Bivariate Relationships	Causal Path		Total
	Direct	Indirect	
Productivity and related diversification	.14		.14
Productivity and unrelated diversification	-.31		.31
Productivity and R&D expenditure per employee	.25	$(.28)(.50) = .14$.39
Productivity and capital-to-labor ratio	.50		.50
Productivity and stock concentration	.30	$(.28)(.31) +$ $(.24)(.25) +$ $(.24)(.28)(.50) = .18$.48
Unrelated diversification and stock concentration	-.28		.28
R&D expenditure per employee and stock concentration	.24		.24

the 10 percent acceptance level or better to be zero and excluded them from the final estimation of path coefficients. Figure 2 reports the final estimates, and Table 5 reports the decomposition of the causal relationships shown in Figure 2.

As reported in Figure 2, the final path model explained 64 percent of the variance in productivity. The evidence suggests mixed support for the model set out in Figure 1. All the paths emanating from management stockholdings were found to be insignificant. Similarly, there was no evidence of causal relationships between stock concentration and related diversification or between stock concentration and capital intensity. However, evidence emerged for the other hypothesized paths. The results suggest that stock concentration affects productivity directly and indirectly, through the mediators of unrelated diversification and R&D intensity. The decomposition reported in Table 5 indicates that 62 percent of the effect of stock concentration on productivity was direct and 38 percent was mediated by unrelated diversification and investment in R&D. As hypothesized, the relationship between R&D productivity was both direct and indirect.⁷

DISCUSSION AND CONCLUSIONS

The study demonstrates the importance of diversification strategy, R&D expenditure, capital intensity, and stock concentration for firms' pro-

⁷ Note that the value of the correlation coefficient between the capital-to-labor ratio and value added per employee may be somewhat inflated by the fact that both variables used measures relating to employees in their denominators.



ductivity. The positive relationships between R&D expenditure and productivity and between capital intensity and productivity were as expected and confirmed prior work reported in the economics literature (Griliches, 1986; Scherer, 1984) and the PIMS literature (Buzzell & Gale, 1987; Gale, 1980).

The negative relationship observed between unrelated diversification and productivity provides support for Hayes and Abernathy's (1980) contention that extensive diversification diverts attention away from the task of improving productivity in a firm's primary industry. These results are consistent with prior studies' observation of lower economic returns for unrelated firms than for related firms (Christensen & Montgomery, 1981; Rumelt, 1974, 1982). Indeed, the findings suggest the possibility that the lower returns of unrelated firms arise from the adverse effects of the strategy on productivity. Thus, the study offers a potential explanation of why unrelated diversification is associated with inferior economic performance, although confirmation requires further research.

The positive relationship between related diversification and productivity is consistent with the superior economic returns observed in the literature for related diversification (Christensen & Montgomery, 1981; Rumelt, 1974, 1982). The findings suggest the possibility that the higher returns of related firms arise from the beneficial effects of the strategy on productivity, although again, confirmation requires further research.

The positive relationship between stock concentration and productivity indicates the importance that a constituency of powerful stockholders has for the efficiency of a firm. The results support our contention that powerful stockholders police efficiency, eliminating X-inefficiencies. A similar relationship was not observed for management stockholdings, perhaps because the management stockholding and stock concentration variables shared explained variance in the dependent variable.

The results also confirm that in addition to a direct effect, powerful stockholders have an indirect effect on productivity through their influence on a firm's diversification strategy and investment in R&D. Strategic choice partially mediated the relationship between stock concentration and productivity. The mediating relationships support the contention that powerful stockholders can use an implicit or an explicit threat to bring an issue to a proxy vote or to sell their stock as a means of influencing the strategic development of a firm in a manner they feel appropriate.

The results further suggest that stockholder preferences are strongest when it comes to unrelated diversification and investment in R&D. They suggest that stockholders favor greater investment in R&D and less unrelated diversification than do managers. We may have failed to observe significant relationships between stock concentration and related diversification and between stock concentration and capital intensity because stockholder preferences are less uniform in these cases than we theorized.

With regard to capital investment, a possible explanation for the failure to find a relationship is that stockholders do not always perceive additional

investment in capital as beneficial. Specifically, they may recognize that expansionist firms have a tendency to overinvest in capital. Porter (1980) documented the reasons for this phenomenon. The consequences of overinvestment include excess capacity and declining firm performance. Thus, it may not always follow that stockholders will prefer higher capital investment than will management.

With regard to related diversification, a possible explanation for the failure to find a relationship is that stockholders recognize the formidable implementation problems that such a strategy creates, including the problems of coordination and control that arise from intraorganizational resource-sharing. Hill and Hoskisson (1987) documented those problems. As a consequence, stockholders may have reservations about the wisdom of related diversification and may disagree among themselves as to its value.

At higher level of abstraction, the research reported here can be viewed as a test of the idea that the efficiency of the capital market varies between firms systematically, depending on the level of stock concentration in a firm. In so far as stock concentration emerged as a significant predictor variable, we conclude that the distribution of ownership in a firm matters. This constitutes a rejection of agency theory arguments concerning the universal efficiency of the market and supports Berle and Means (1932). On this point, the present study conflicts with the only other study that has used the Corporate Data Exchange data base on stockholding, Demsetz and Lehn (1985). Those researchers found no relationship between a Herfindahl measure of stock concentration and return on assets and concluded that issues of stock concentration were irrelevant. However, they made no attempt to control for industry differences in return on assets, which constitutes a serious flaw in their methodology and allows us to view their findings with skepticism.

The current findings also have implications for the study of managerial behavior. They suggest that efficiency is not foremost in managers' minds when they formulate corporate strategies. Rather, managers prefer strategies that increase corporate size and reduce risk, even at the expense of efficiency. When stockholdings were diffused, we observed that firms engaged in greater unrelated diversification and less R&D expenditure than when this was not the case. Thus, the results were consistent with the idea that managers seek to maximize a utility function that includes remuneration, power, security, and status as its central elements.

A limitation of the current study is that the analysis was cross-sectional. We used static data to test for what are undoubtedly dynamic relationships. Longitudinal analysis would have been preferable, but unfortunately, the lack of comprehensive longitudinal data on ownership structure similar to that provided by the Corporate Data Exchange precluded such an analysis.

In conclusion, from a management perspective, the study underlines the importance of capital intensity and investment in R&D for firms seeking to improve their productivity. There is also more than a suggestion in the data that although related diversification can improve productivity, presumably

through resource sharing, unrelated diversification can have serious negative consequences for the productivity of a firm and should be avoided. From a research perspective, the study points to the importance of ownership structure as a determinant of strategic choice. Essentially, it seems that powerful owners constrain the freedom of choice that managers might otherwise enjoy to pursue certain strategies. Considerations of ownership, therefore, might help explain why firms choose different strategies, a possibility that warrants further investigation. In addition, as suggested above, the study indicates that the links between diversification strategy, productivity, and profitability are a deserving subject for future research.

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Charles W. L. Hill is an assistant professor of management in the Department of Management and Organization at the University of Washington. He received his Ph.D. degree from the University of Manchester, in Great Britain. His research interests include corporate ownership, corporate strategy and structure, and the comparative study of markets and hierarchies.

Scott A. Snell is an assistant professor of management and organization at Pennsylvania State University. He received his Ph.D. degree in management from Michigan State University. His research interests include human resources, strategic management, and control.

STOCKHOLDER REACTIONS TO CEO CHANGES IN LARGE CORPORATIONS

MICHAEL H. LUBATKIN
University of Connecticut

KAE H. CHUNG
Wichita State University

RONALD C. ROGERS
University of South Carolina

JAMES E. OWERS
University of Massachusetts

The literature on leadership suggests that the performance context of a succession event and the origin of a newly appointed leader moderate the relationship between the succession and its consequences for performance in large corporations. We tested that premise with data from 477 large corporations and a measure of excess stock market returns. The findings show that investors are most favorably predisposed to successions in which outsiders are appointed to financially healthy firms.

The scholarly and business worlds alike are giving increasing attention to executive accountability, partly because pressures from stockholder groups are mounting on this issue. Researchers, however, remain divided as to whether appointing a new leader influences the performance of a large organization. Some have found that leadership doesn't matter: a leader will not alter performance because organizations—particularly large ones—tend to run themselves (Hannan & Freeman, 1977; Lieberman & O'Connor, 1972; Mintzberg, 1979). Thus, the replacement of a leader also will not matter; succession becomes ritual scapegoating (Gamson & Scotch, 1964). Others have found that leadership does matter (Weiner & Mahoney, 1981) but that the disruption that succession causes cancels the positive effect of replacing an unsuccessful manager (Pfeffer & Davis-Blake, 1986). Still other researchers have argued that whether a new leader has a positive, neutral, or negative influence on performance depends on the match between the leader's characteristics and the job requirements (Gupta & Govindarajan, 1984; Hambrick & Mason, 1984). However, subsequent studies have not uncovered a consistent set of contingent factors that explain when a positive succession-performance relationship will occur in large corporations (Beatty & Zajac,

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1987; Friedman & Singh, 1987; Furtado & Rozeff, 1987; Lubatkin, Chung, Rogers, & Owers, 1986; Reinganum, 1985).

There are at least three reasons, however, to investigate further the possibility that executive succession can influence the financial performance of large organizations. First, compelling anecdotal evidence from the business world supports the position that leadership can make a difference in large organizations. For example, it is difficult to overlook the contributions of Jack Welch at General Electric, John Opel at IBM, and Lee Iacocca at Chrysler Corporation. Second, most studies have overlooked the presuccession performance of firms experiencing succession and failed to consider the origin of a successor in light of that context. Research on corporate turnaround (Hofer, 1980; Schendel, Patton, & Riggs, 1976) and on the causes of executive succession (Dalton & Kesner, 1985) has, however, recognized the importance of these two contingent factors, as did Hall (1987), who argued that a leader is important only in times of organizational crisis, change, and growth.

Third, some of the ambiguity surrounding the succession-performance issue may originate in the way that financial performance is defined. Succession studies have traditionally defined performance by an accounting-based measure such as return on assets or by a security market-based measure such as abnormal returns. The finance literature, however, has developed a strong case for using a security market measure called excess returns (Scholes & Williams, 1977). This measure overcomes the principal criticisms of the abnormal returns measure and grants researchers the advantages of using stock market data. Only recently have data files existed that allow researchers to adopt this measure in large-sample studies.

The present study extended past research efforts by examining two factors that are believed to be important determinants of succession and leadership effects: organizational context, in terms of presuccession performance, and successor's origin as an insider or as an outsider. Using a multiple regression design, we simultaneously considered the independent and interactive effects of those two contingent factors while controlling for organizational size. We calculated the dependent variable, excess returns, over various time horizons to distinguish between succession effects and longer-term leadership effects. Finally, a large data set (477 instances of appointments) permitted a rigorous testing of hypotheses relating chief executive officer (CEO) succession to performance.

PREVIOUS RESEARCH

Performance Context

Previous research has suggested that the performance of an organization before a leader's replacement is an important contextual factor. For example, organizational performance is a major determinant of executive tenure (Allan & Panian, 1982; James & Soref, 1981; Salancik & Pfeffer, 1980), and executive replacement is a common response to poor financial performance (Brady & Helmich, 1984; Dalton & Kesner, 1985).

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Strategic management and organization theory scholars have also asserted that an organization's performance influences its adaptiveness (Bourgeois, 1981; Dutton, Fahey, & Narayanan, 1983; Litschert & Bonham, 1978). Firms that can generate resources in excess of their needs to pay suppliers, develop markets, attract employees, fend off competitors' attacks, and otherwise engage in basic business activities have "slack." Slack gives an organization the luxury of making decisions that are based on extensive information searches (Fredrickson, 1985), maintaining stability through intermittently good and bad times (Cyert & March, 1963), and attracting capital at low cost from the debt and equity markets (Porter, 1985). Slack may also foster creative behavior (Bourgeois, 1981), a motivated and committed work force (Gupta & Govindarajan, 1984), and a culture that identifies with winning; opposite effects are expected in low-performance settings. In addition, the leaders of high-performing firms should perceive a wide array of investment options and be granted great discretion in adjusting to environmental influences (Hambrick & Finkelstein, 1987).

It is tempting to conclude that leaders who inherit a high-performance context have greater opportunity to affect future performance than leaders who inherit a low-performance context. However, low performance may also influence the adaptiveness of organizations, although the process is quite different. Low performance is associated with a sense of urgency and a departure from some desired status quo. Although managers may lack the time and resources for extensive information searches during times of low performance, their decisions may be at least as rational and have as much impact as those made in a high-performance context. As Cyert and March (1963) observed, poor performance pressures managers to make precise, discriminating decisions because they have little margin for error. Mintzberg, Raisinghani, and Theoret (1976) noted that during times of high performance managers tend to direct attention to problems but are more casual with opportunities, which they assume can be exploited. Hall (1987) viewed both performance contexts as important.

Two studies have examined the role of presuccession performance in explaining stock market reactions to succession events. Lubatkin and colleagues (1986) found no relationship, and Friedman and Singh (1986) found (at the .10 level of significance) that when presuccession performance is poor, the market's reaction to succession tends to be positive. The two studies share three potential research flaws. Both dichotomized the context variable into high- and low-performance categories rather than letting it remain continuous and thus lost information that may have borne on their results. They used as their dependent variable a short-term measure of abnormal return that may have failed to capture the full stock market reaction to the succession events. Finally, they failed to adequately account for another important contextual factor, organizational size.

Given the drawbacks in past studies of the performance-context issue and the conflicting theories on the subject, we will again test the following general hypothesis:

Hypothesis 1: Holding size constant, the performance of a firm at the time of a succession event will affect the ability of a newly appointed leader to influence future earnings.

Successor Origin

Previous research has also supported the existence of a linkage between the origin of a successor and firm performance. For example, during a small-sample field study, Kotter (1982) observed that outsiders who lacked a thorough understanding of the business that they were inheriting generally contributed less to their organizations than did insiders. Further, outsiders have a greater disruptive influence on an organization (Allen, Panian, & Lotz, 1979), which may in turn produce negative outcomes like a decline in morale and an increase in turnover (Grusky, 1964). Finally, an outside appointment may signal the failure of a firm's human-capital-investment program to develop depth in its management ranks and therefore raise questions about the firm's ability to compete in the future (Furtado & Rozeff, 1987).

As with performance context, the linkage between successor origin and future organizational performance remains conceptually appealing but empirically ambiguous. Lubatkin and colleagues (1986) and Friedman and Singh (1987) found that outside appointments produced significantly higher abnormal returns than inside appointments. Furtado and Rozeff (1987) found the opposite, and Beatty and Zajac (1987) found no distinction between the two types of appointments. Reinganum (1985) found significant, positive abnormal returns only for outside appointments in small firms in which the announcement of the appointment coincided with the announcement of the departure of the former officeholder. None of these studies has explicitly accounted for the size of each firm studied, though all have recognized that size is a potentially important covariate.

In light of the inconsistent findings about successor origin,

Hypothesis 2: Holding size constant, the origin of an appointed successor will affect his or her ability to influence future earnings.

Interactive Effects

A contingency view of management succession suggests that whether a new leader has a positive, neutral, or negative influence on performance depends on how well the characteristics of the leader match the requirements set by the context of a job (Fiedler, 1964; Gupta & Govindarajan, 1984; Hambrick & Mason, 1984). Consistent with this view, we developed an additional hypothesis that recognizes that the different task demands associated with high- and low-performing firms may require the different leadership influences associated with outside and inside appointments.

A contingent relationship is expected for firms that are performing poorly at the time of a succession event. Previous research suggests that outsiders will be more able to turn such firms around than will insiders

(Bibeault, 1982; Hofer, 1980; Starbuck, Greve, & Hedberg, 1978; Schendel & Patton, 1976). Because insiders may have a limited perspective (Cyert & March, 1963), they are less able to deal with changes in an organization's environment (Hambrick & Mason, 1984). In contrast, outsiders have been associated with organizational adaptiveness and change since they have less commitment to an organization's strategies and values (Helmich, 1975; Pfeffer, 1981). As a result, they are more likely to alter its mission, objectives, and strategy (Pfeffer & Salancik, 1978).

The opposite contingent relationship is expected for high-performing firms. Because insiders are less disruptive to an organization than outsiders (Brown, 1982; Helmich, 1977), they may be more able than outsiders to maintain high performance.

Hypothesis 3: The performance of a firm prior to a change in leadership and the origin of a successor moderate the relationship between executive succession and subsequent earnings. Specifically,

Hypothesis 3a: Outsiders will have a more positive impact on performance in low-performing firms than insiders will.

Hypothesis 3b: Insiders will have a more positive impact on performance in high-performing firms than outsiders will.

Organizational Size: An Extraneous Influence

Many studies of leadership have recognized the importance that the size of an organization has for the ability of a leader to influence performance. For example, large organizations are associated with entrenched power structures that help to insulate top management from external pressures. As a result, it seems that large organizations are more likely than small ones to replace top managers from inside (Dalton & Kesner, 1983; Furtado & Rozeff, 1987) and more likely to minimize the influence that a new leader may have on corporate performance (Hall, 1987; Hannan & Freeman, 1977). Although most succession studies have not established explicit controls for size, it follows that such controls are important. The studies by Furtado and Rozeff and by Reinganum established categorical controls by arbitrarily splitting their samples into two size groupings, large and small firms, and then presenting abnormal returns for each. A limitation with categorical controls is that they lose information that may have a bearing on the results. The present study controlled for the effects of size by including it as a continuously scaled independent variable in a multiple regression equation.

METHODS

Sources of Data

An exhaustive list of firms in which a succession had taken place and the origins of the successors were identified from *Forbes's* annual June is-

sues about executive compensation. Because these issues list the 800 firms with the highest paid executives, the population is biased toward organizations that believe in the importance of leadership, at least in so far as high salaries are evidence. Indirect support for this assertion comes from a study by Coughlan and Schmidt (1985), who found compensation (salary plus bonus) to be significantly related to abnormal stock-price performance. We identified 1,187 CEO successions during the period 1971–85. We then excluded CEO appointments where we could not clearly identify the first public announcement in the *Wall Street Journal* and all appointments in firms that made confounding announcements of major corporate events such as mergers, dividend changes, and capital expenditure plans during a two-month period (50 trading days) before the succession announcement ($t - 50$, $t - 1$). We used that criterion to control for the possibility that announcements of other events might bias findings attributed to an executive appointment. The period over which we measured presuccession performance (described under Independent Variables) was also carefully screened for possible takeover bids, succession events, and other major corporate events that might conceal the firms' long-term performance trends. Also, the appointments made had to be lasting; we excluded firms that made a second CEO appointment during the 200 trading days after the succession event we were studying. In short, the general selection rule followed was to exclude a succession event if there was reasonable evidence of a potentially confounding event. A total of 573 cases remained. Of those, 505 met an additional requirement for inclusion which was that the firm be listed on the Center for Research in Security Prices (CRSP) Daily Excess Returns Data File for a full 300 trading days (approximately 15 months) before and after the succession announcement so that we could obtain estimates for the five dependent variables (see Time Frame) and the performance-context variable. A final criterion for inclusion had to do with determining the origin of the successor: we excluded 28 cases from further investigation because the successor did not fall into either origin category (categories are described under Independent Variables). The final group therefore included 477 succession cases at 357 firms and represented 40 percent of the 1,187 cases identified in *Forbes*.¹

Dependent Variable: Excess Returns

Given the limitations of accounting-based measures, researchers in management have given more attention to the use of capital market measures to evaluate the effect of events like management succession (Lubatkin & Shrieves, 1986). These measures are *ex ante* measures in that they reflect investors' expectations of future performance. As such, capital market measures contrast with traditional accounting-based measures, which are *ex post*, reflecting historical performance patterns. Capital market measures

¹ Eight percent of the group were delisted from public listings between 14 and 60 months after the announcement of the CEO changes we studied.

assess the influence of an event on a firm's security (common stock) by estimating the normal, or expected, return to the stock in the absence of an event. The abnormal, or unexpected, return to the stock is the difference between its observed return and its expected return. Positive abnormal returns suggest that stockholder value is being created.

Theoretically, abnormal returns represent an unbiased estimate of investors' evaluation of the changes in future earnings that they expect because of some firm-specific event, such as a change in leadership, and not because of overall market movements. Thus, abnormal returns should be a strong surrogate for actual economic performance. In practice, however, the market model's ordinary-least-squares estimates of abnormal returns suffer from a potentially serious econometric problem. The problem results from nonsynchronous trading of securities: many securities are traded infrequently, and their prices are therefore only reported at distinct random intervals. This irregularity makes calculations of returns "for almost all securities biased and inconsistent" (Scholes & Williams, 1977: 310). To date, researchers have tolerated this bias because of computational difficulties associated with correcting for it.

In 1983, CRSP made available a daily returns file that corrects for nonsynchronous bias. For this file, called the Daily Excess Returns File, CRSP computes excess returns, or the unbiased analogues of abnormal returns, through a three-step procedure originally developed by Scholes and Williams (1977). First the Scholes-Williams beta, or systematic risk, is computed for each security using a three-day moving-average market window. Beta, or systematic risk, represents the sensitivity of a firm's returns to overall stock market trends. The three-day moving average ensures against potential nonsynchronous trading problems (Brown & Warner, 1985). Next, on the basis of average annual betas, CRSP ranks all securities traded on the New York and the American Stock Exchanges into ten risk classes; the first contains securities with betas in the 90th percentile or higher, the second, securities with betas in the 80th to 89th percentiles, and so on. Finally, excess returns are computed for each firm for each day by (1) calculating the firm's one-day common stock return, which is change in price after adjustment for any stock splits or dividends, (2) identifying the risk class that most closely matches the firm's level of systematic risk, and (3) calculating the one-day portfolio returns of all firms in that risk class and then subtracting that return from the firm's stock return. The Appendix details this three-step procedure.

In addition to correcting for nonsynchronous bias, excess returns use a superior benchmark, or control, to represent normal or expected returns. Whereas abnormal returns are calculated for each firm by comparing its returns to some market-wide adjusted average, excess returns compare a firm's returns only to the returns of firms in the market that have similar levels of systematic risk. To the extent that firms that have similar risk profiles are also similar along various dimensions that determine systematic risk and stockholder return, such as organizational size (Ben-Zion & Shelit,

1975), financial leverage (Hamada, 1972), cyclicalities (Fabozzi & Francis, 1979), and market power (Moyer & Chatfield, 1983), excess returns will better control for influences extraneous to research objectives than will abnormal returns.

All capital market measures, including excess returns, however, suffer from one shortcoming: they can only estimate the full impact of wholly unanticipated events. Succession events are not likely to be wholly unanticipated; indeed, we could argue that all leadership changes are partially anticipated, except, of course, those caused by the untimely death of an incumbent. This shortcoming, however, need not invalidate the use of market measures for hypothesis testing. First, early anticipation biases the results against finding stock returns that differ in a statistical sense from their expected level, thus promoting a conservative test (Beatty & Zajac, 1987; Brown & Warner, 1985). Second cumulating excess returns over various time horizons surrounding an announcement day allows approximation of the impact of early investor awareness on stock returns. A later section discusses the issue of time frame and describes the horizons used in this study.

Independent Variables

The performance context of firms at the time of the succession events was approximated by cumulating their excess returns over 200 trading days (approximately 9.5 months), beginning 300 trading days before the first public announcement of an executive change. This period should be adequate to capture long-term trends in investors' expectations of future earnings and thus should approximate firm performance in the absence of a change in leadership. We excluded the 100 trading days immediately preceding the announcements to minimize the chance that the succession events themselves would bias the context measures, which would be the case if investors anticipated events before their first public announcement. The validity of the context variable used in this study to represent the financial well-being of a firm at the time of the succession event can be gauged by observing the ratio of succession firms we studied with negative context measures—those performing less well than firms with similar risk—and those with positive context measures. Inasmuch as executive replacement is a common response to poor performance, a valid context measure should find most successions to be in poorly performing firms. Indeed, about 65 percent of the firms used in this study performed less well than firms with similar risk during the designated context period. A chi-square statistic significant to the .01 level suggested that the observed frequency of low-performing firms differed from what would be expected if below-market performance randomly occurred in the population.

The origin of the successor CEO was determined in a straightforward categorical way with one provision: to avoid blurring the distinction between insider and outsider, we designated an insider as a successor who had

at least five years of tenure with the firm in question and an outsider as a successor who had not been with the organization for more than one year before moving to the top. In virtually all cases, outsiders were brought directly into the position of CEO. Thus, the definition used in this study represents extreme cases of outside appointments and is comparable to Vancil's definition of recent outsider (1987: 262), rather than to his broader definition of outsider (1987: 56). We excluded cases that did not fall into either category from further investigation. Computationally, origin is a dichotomous dummy variable defined as 0 if a successor was an insider and as 1 if a successor was an outsider. We examined possible moderating effects of context and origin by including an interaction variable in the multiple regression model.

A final independent variable, corporate size, was added to the regression equation as a control variable. We measured size as a continuous independent variable, by calculating the logarithm of each firm's stock market capitalization (price per share times number of shares outstanding) on the last trading day of the year immediately preceding the year of a CEO appointment. We also controlled size by limiting the population of succession cases to large organizations. Finally, we checked correlation of size with the other independent variables to determine if size was an important covariate.

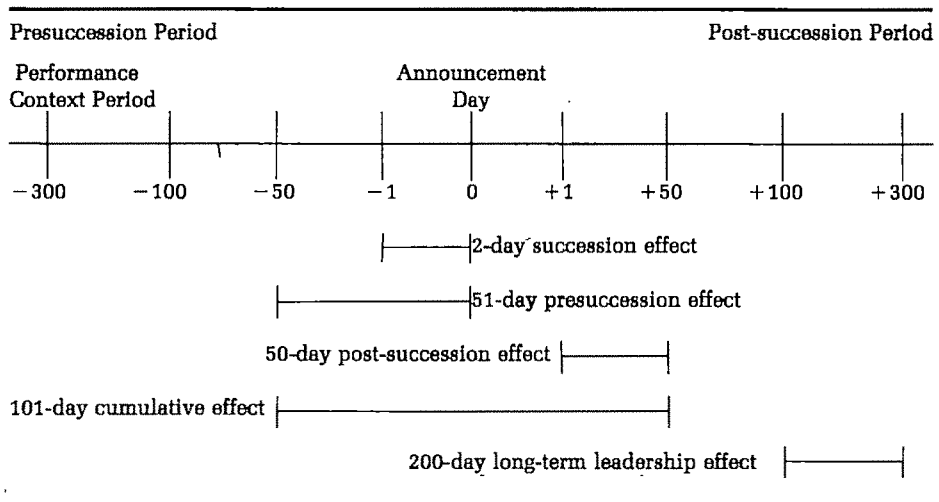
Time Frame: Selecting the Relevant Horizon Length

If a change in CEO is viewed as a favorable indicator for future earnings, the market price of a firm's stock will increase as investors learn of a leadership change. The problem facing researchers is determining exactly when investors know all succession-related information (Malatesta & Thompson, 1985). Studies in finance journals have tended to define the relevant succession time frame as the announcement day plus the trading day preceding it (Furtado & Rozeff, 1987).

Studies in management journals, however, have argued that the two-day announcement effect may not capture the full market evaluation of a succession event (Beatty & Zajac, 1987; Lubatkin & Shrieves, 1986; Reinganum, 1985). For example, Reinganum discussed the possibility of information leaking to the marketplace before a change in leadership is officially made public. He also recognized the possibility of noninstantaneous investor reactions occurring during the period after an announcement. For the current study, therefore, we cumulated excess daily returns over five different horizons and then performed multiple regression analyses on each. Figure 1 illustrates the five horizons.

One horizon is the commonly used 2-day announcement period ($t - 1$, $t = 0$), in which $t = 0$ is the day of the first public announcement of a succession and $t - 1$ is the trading day immediately preceding the announcement day. The results of such short-term analysis should capture investors' perceptions about the effects on a firm's future earnings of a suc-

FIGURE 1
Various Time Horizons Surrounding Succession Announcements



cession event itself, rather than the anticipated effect of the newly appointed leader.

The second horizon ($t - 50$, $t = 0$) is a period of about two and a half months (51 trading days) preceding and including an announcement day; it is designed to capture early market awareness of a leadership change. Although it was not possible to identify the precise date of market awareness for each firm, the time period examined here should be long enough to capture most succession-related information and short enough to avoid any serious bias from unrelated, firm-specific events.

The third horizon ($t + 1$, $t + 50$) allowed us to examine excess returns during the two-and-a-half-month period immediately following an announcement day. With the uncertainty resolved concerning *if* and *when* a leadership change will occur and *who* will be appointed, investors can re-evaluate their initial expectations about future earnings. Further, investors are likely to form their revised perceptions on the basis of a different set of factors, those that can only be known with certainty after the appointment of a new leader. This situation pertains particularly if investors did not anticipate who the new leader would be.

The fourth horizon ($t - 50$, $t + 50$) covers the full 101 trading days surrounding and including an announcement day and allows cumulation of the returns for the second and third horizons.

The final horizon ($t + 100$, $t + 300$) captures the performance of firms over a nine-and-a-half-month period beginning 100 trading days after a succession announcement. This period should be adequate to capture long-term trends in investor expectations but be free of any residual succession effects. Further, the results for this horizon may best capture leadership effects be-

cause it approximates a period when a new leader is likely to make substantive changes in strategic and operational domains.

Methods of Analysis

A multiple regression equation for both the independent and interactive effects of the two contingent factors and the independent effects of corporate size on stockholder returns, the dependent variable,⁶ was developed in the following form: excess returns = f (context, origin, context \times origin, size).

Although the signs and magnitude of the regression coefficients are sufficient for testing the significance of the interaction between context and origin, they do not say much about the form of the contingency relationship. Specifically, the coefficients alone may not allow for clear inferences about when it is best to hire an insider and when an outsider. By segregating the firms by origin and by performance context, we pushed the analysis of the third hypothesis to a second stage. In order to dichotomize the context variable, we first ranked firms according to their context measure and then partitioned the ranking into approximate thirds. The high-performing third consisted of firms with positive context measures, or firms that demonstrated the ability to yield returns better than the security benchmark returns during the designated context period. The low-performing third consisted of firms with strongly negative context measures. In order to maximize contrast, we excluded the middle third from this investigation but included it in the regression analysis. We then calculated a mean measure of excess returns for each of the four possible contingencies that come from the intersection of the two origin and context classifications. Finally, separate two-tailed *t*-tests of mean differences were used to statistically compare investors' reactions to insider and outsider appointments to each of the two presuccession contexts.

RESULTS

Of the 477 succession cases analyzed, 305 firms (65 percent) performed less well than firms with similar risk during the designated context period. Inside appointments were involved in 423 firms. The low percentage of outside appointments (11.3%) is consistent with the findings of other succession studies in large corporations. For example, Beatty and Zajac (1987) found the incidence of outsiders to be 12 percent and Friedman and Singh (1987) found it to be 15 percent. Also, Furtado and Rozeff (1987) found that as firm size increased, the incidence of outsiders decreased.

Finally, the current data are heavily biased toward largeness. The mean equity market capitalization is \$1,825 million, with a minimum of \$17 million (Allied Supermarket in 1975) and a maximum of \$46,792 million (IBM in 1982). The firms are therefore considerably larger than the typical large firm in Reinganum's (1985) sample, which had a median market value of \$280 million. Finally, only 21 firms (4.4%) in the current sample had market values below \$65.5 million, the size used by Reinganum to separate large firms from small ones.

In sum, the high incidence of poor performance before changing CEO, the low incidence of outside appointments, and the overall largeness suggests that the set of firms collected in the present study adequately represents the population of large industrial organizations at a time when they change their CEOs.

Table 1 presents the means, standard deviations, and intercorrelations of all variables. Table 2 summarizes the results for the 51-day preannouncement period ($t - 50, t = 0$), the 50-day post-announcement period ($t + 1, t + 50$), and the 101-day cumulative succession period ($t - 50, t + 50$). Similarly, Table 3 summarizes the results of the multiple regression equation performed on excess returns during the 2-day announcement period ($t - 1, t + 0$) and the 200-day long-term leadership period ($t + 100, t + 50$).

Overall, investors are not indifferent about changes in leadership. Rather, the means in Table 1 shows that investors, on the average, revise downward their earnings expectations, driving down a firm's stock price an average 1 percent during the preannouncement period ($p < .01$) and an additional 3.5 percent during the 50-day post-announcement period ($p < .01$). These findings suggest that investors do not view CEO succession as unimportant or as an exercise in ritual scapegoating (Gamson & Scotch, 1964). Further, they suggest that investors do not generally hold an overly "romanticized view of leadership" (Meindl, Ehrlich, & Dukerich, 1985). To the contrary, investors appear skeptical about the alleged positive intentions that motivate succession decisions. However, as predicted, the consequences of succession for performance depend on the conditions surrounding the event.

The hypothesis about context (Hypothesis 1) received partial support. As expected, the performance of a firm during the time preceding a succession event influences investors' assessment of executive changes, at least during the 51-day presuccession horizon, as reported in Table 2. During this presuccession period, the influence of context on excess returns is positive and significant ($p < .05$), indicating that the better firms perform before changing CEOs, the more favorably predisposed investors are to a change. However, context as an independent factor does not appear to have an important bearing on investors' expectations during the 50-day post-succession period (Table 2) and the 2-day announcement period (Table 3), suggesting that the information value of context as it relates to a succession event is fully discounted by the time an event occurs. Finally, context again appears to influence investors' expectations during the 200-day post-succession period, although the causation is weak ($p < .10$) and inverse (Table 3). We posited that during this stewardship period, investors base their expectations on their assessment of a leader's initial strategic and operational decisions rather than on the effects of succession per se.

The results also indicate partial support for the hypothesis about origin (Hypothesis 2). In the case of outside appointments, origin appears to have positive and significant effects on investors' expectations for all time frames

TABLE 1
Means, Standard Deviations, and Intercorrelations for All Variables^a

Variables ^b	Means	s.d.	1	2	3	4	5	6	7	8
1. Context	-0.07**	0.25								
2. Origin	0.11**	0.31	-.06							
3. Interaction term	-0.01**	0.11	.42**	.15**						
4. Logarithm of size	6.13**	3.43	-.05	-.13**	.07					
5. Daily excess returns (-1, 0)	0.00	0.04	-.00	.08*	.04	-.03				
6. Daily excess returns (-50, 0)	-0.01**	0.12	.12**	.04	.07	.03	.21**			
7. Daily excess returns (1, 50)	-0.03**	0.13	.07	.09*	.09*	.02	.00	-.09*		
8. Daily excess returns (-50, +50)	-0.04**	0.17	.14**	.09*	.12**	.04	.15**	.65**	.70**	
9. Daily excess returns (100, 300)	-0.05**	0.24	-.09*	.10**	-.08*	.02	.02	-.01	.11**	-.01

^a N = 477

^b Daily excess returns are cumulated over the time frame indicated within the parentheses.

+ p < .10

* p < .05

** p < .01

TABLE 2
Results of Multiple Regression of Succession for Three Time Horizons

Variables	51-day Presuccession Period ^a		50-day Post-succession Period ^b		101-day Cumulative Interval ^c	
	Betas	Standard Errors	Betas	Standard Errors	Betas	Standard Errors
Intercept	-.004	.015	-.022	.015	-.027	.020
Context	.057*	.025	-.005	.024	.052	.033
Origin ^d	.029	.019	.055**	.019	.084**	.025
Interaction of context and origin	.025	.060	.156**	.058	.181*	.078
Size	.000	.002	-.002	.002	-.002	.003
F _{4,472}	2.31*		3.76**		5.42**	
R ²	.02		.03		.04	

^a Period defined as $t - 50$, $t = 0$

^b Period defined as $t + 1$, $t + 50$

^c Period defined as $t - 50$, $t + 50$

^d Origin is a dichotomous dummy variable with 0 = inside successor, 1 = outside successor.

† $p < .10$

* $p < .05$

** $p < .01$

except the 51-day presuccession period. The findings, therefore, clearly suggest that investors view an outside appointment as having a more favorable impact on earnings than an inside appointment. Further, the origin findings are noticeably different from the context findings regarding when each influences investors' expectations: investors appear to be more concerned with the context of succession events before CEO changes and more concerned with the origin of new leaders after the changes. Apparently, investors have no accurate knowledge of information embedded in the broad origin measure on the likelihood of strategy, policy, and administration changes until after a successor is announced.

Perhaps the most interesting results come from testing Hypothesis 3. During the 50-day post-succession period, the time after investors have discounted the effects of context, new information, such as origin and origin in light of context, appears to influence investors, as shown by a positive interaction term ($p < .01$). Similarly, the 101-day cumulative period also reveals a positive and significant interaction term ($p < .02$).

Finally, the regression model as a whole does not explain much variance in excess returns, as evidenced by the low R^2 statistics. However, the F -statistics reveal that the model does account for significant variance in excess returns for all but the 2-day announcement period. A significant F suggests that at least one hypothesized relationship is not equal to zero.

TABLE 3
Results of Multiple Regression of Succession for Two Time Horizons

Variables	2-day Succession Period ^a		200-day Leadership Period ^b	
	Betas	Standard Errors	Betas	Standard Errors
Intercept	-.001	.004	-.041	.029
Context	-.004	.007	-.083†	.048
Origin ^c	.012*	.006	.068†	.037
Interaction of context and origin	.025	.017	-.022	.115
Size	-.000	.001	-.004	.004
$F_{4,472}$		1.52		2.48**
R^2		.01		.02

^a Defined as $t - 1$, $t = 0$.

^b Defined as $t + 100$, $t + 300$.

^c Origin is a dichotomous dummy variable with 0 = inside successor, 1 = outside successor.

† $p < .10$

* $p < .05$

** $p < .01$

Further, the importance of each independent variable changes over the different time horizons. These findings support the contention, raised in management journals, that research needs to assess investors' reactions to corporate events over a number of pre- and post-event time periods.

It is also important to note that the multiple regression model includes size as an independent variable, and in no case does size emerge as an important explanatory variable. Further, size is significantly correlated with origin, although the correlation, as reported in Table 1, is small ($-.13$). The low magnitude of correlation suggests that any distortions in the regression coefficients due to multicollinearity were minor. The explanation for finding no size effect may lie in the construction of both the data set and the excess returns measure. Recall that the data set only consists of large firms and that the returns measure uses a control that minimizes extraneous influences on stock returns like size.

Table 4 presents two contingency matrixes to help clarify the form of the significant interaction terms and in the process provide additional insight as to the two contingent relationships predicted by the third hypothesis.

Regarding the first contingent relationship, investors seem indifferent to origin when succession occurs in low-performing firms. Whether leaders are appointed from inside or outside an organization, the values of these low-performing firms drop an additional 4 percent during the 50-day post-succession time frame and about 6 percent overall for the 101-day cumulative time frame, suggesting that investors are generally pessimistic about the ability of a new leader to reverse a firm's behavior. The findings on insiders

TABLE 4
Contingency Matrixes: Mean Excess Returns by Origin and Context^{a,b}

(a) 50-day Post-succession Period		
Origin	Performance Context	
	High	Low
Insiders	-.038 (.123) 144	-.042 (.154) 131
Outsiders	.021 (.133) 17	-.038 (.200) 23
Mean difference	1.85†	0.11

(b) 101-day Cumulative Interval		
Origin	Performance Context	
	High	Low
Insiders	-.036 (.160) 144	-.056 (.183) 131
Outsiders	.071 (.250) 17	-.057 (.249) 23
Mean difference	2.53**	0.02

^a In each cell, the first number is the mean excess return expressed as a decimal. The number in parentheses is the cross-sectional standard deviation of the mean. The bottom number is the number of observations for that cell.

^b Overall, during the designated 200-trading-day period, firms in the high performance succession context (the top thirtile) had a mean excess return and standard deviation of 0.204 (.175) and the low performing firms (bottom thirtile) had -0.324 (.139). To maximize contrast, we excluded 162 midrange performers from this investigation but included them in the regression analysis. Overall, the midrange performers had a mean excess return and standard deviation of -0.083 (.057).

† $p < .10$

** $p < .01$

are therefore consistent with the third hypothesis, but the findings on outsiders are not. We predicted that outsiders will be more able to turn low performers around than insiders would be.

Regarding the second contingent relationship predicted by the third hypothesis, the results suggest that good presuccession performance amplifies investors' positive evaluation of an outside appointment. The value of these firms' stock increased an average 7 percent during the 101-day succession interval, a mean return significantly larger ($p < .01$) than the 3.5 percent decline observed for inside appointments in the same performance context. This finding is inconsistent with the prediction that outsiders will be less able than insiders to maintain high performance.

DISCUSSION

This study showed that investors typically seem to revise their expectations of cash flows downward during the time surrounding a succession announcement. However, not all appointment announcements convey neg-

ative information. For example, investors appear to react favorably to announcements when the two independent factors—high performance and outside appointment—coincide.

Since the results for outside appointments in high-performance settings departed from expectations, some reconciliation with prevailing theory is in order. Fundamental to the second and third hypotheses is the assumption that outsiders have a disruptive influence on organizations because they are less committed to the organizations' strategies, values, and people than are insiders. Perhaps, contrary to expectations, high-performing firms are more receptive to hiring from the outside because the security and status of existing managers are relatively secure during periods of prosperity. As Helmich (1975) stated, successful groups may perceive a new successor as a force that will stimulate change and reinforce positive behaviors. This is not to say that capable insiders could not be as effective, but rather that the pool of all available candidates may be larger for high-performing firms. Moreover, perhaps investors interpret the appointment of an outsider to a high-performing firm as a signal of the firm's intention to remain adaptive. Perhaps investors expect outsiders to serve investors' interests more than entrenched insiders. These explanations are generally consistent with those in a recent Hay Group Incorporated study reported in *Business Week* (1986). Its major finding was that many firms, including companies that are growing, benefit by putting outsiders in key positions.

The announcement of an inside appointment in the high-performance context may not convey the same adaptive message. Rather, an inside appointment may signal the continuation of the previous administration's mind set. Although that is not necessarily bad, organizational studies have shown that when success breeds pervasive continuity, political obstacles to reorientation grow.

The result for outside appointments in low-performance contexts is also interesting because it suggests that although the appointment of an outsider may be an essential ingredient for turnaround, it may not be sufficient. Perhaps an outsider brought into a low-performance context with the task of turning a company around will have a great disruptive effect. One reviewer of the present research pointed out, however, that the level of disruption may have more to do with the expectations the members of a firm hold regarding the origin of the successor than the origin per se. For example, Gouldner (1954) found outsiders to have a disruptive influence, but Guest (1962) did not. However, the gypsum mine workers in Gouldner's study were accustomed to inside successors, and the employees at the automobile plant in Guest's study were expecting an outside successor. A second reviewer suggested caution when comparing leadership succession among industrial workers with executive succession at large corporations.

Perhaps, in a competitive market for management talent, low-performing firms are unable to attract the best available managers (Pfeffer & Davis-Blake, 1986). Or perhaps such firms, faced with dwindling resources,

deteriorating morale, and competitive disadvantages in their current product markets, tend to continue to decline in spite of a leadership change. Whatever the explanation, one point is clear: succession-induced turnarounds such as Chrysler Corporation's may be the exception. As Hambrick and Schecter noted: "There is an abundant folklore on how to revive poorly performing businesses, but systematic evidence about turnaround is scant" (1983: 231).

The overall evidence suggesting that investors view outside successors more favorably than insiders is puzzling, given the dearth of outside appointments. Recall that investors reacted favorably to outside appointments at the time of announcements (the two-day succession effect). Further, they continued to revise their expectations significantly upward during the post-succession period and the long-term leadership period. In light of these findings, why are insiders favored by a margin of nine to one?

Other questions emerge from the findings of this study. What motivates a high-performing firm to change leaders? Are low-performing firms openly aware of their poor performance? Do investors react more favorably to firms in which the transition between top managers is orderly and to firms that disclose the true reasons for a change in CEO? These questions call for additional investigations of succession events.

Finally, this study has implications for traditional event-study methodology and for the conclusions of succession studies that have used such methodology. First, we introduced a measure of security benchmark returns that retains the advantages of stock-price measures and overcomes their principal limitations. Second, this study investigated investor reactions to succession announcements over various horizons preceding and following the events and found that the results of the regression model were significant for all but the two-day announcement period. Further, this study found that each explanatory factor is important during a different horizon. The contrast in findings for the two-day announcement period and the longer horizons suggests that studies that rely on short horizons immediately surrounding an event may not accurately capture succession-related returns. This observation does not call into question the efficiency of capital markets but suggests that investors cannot make final judgments on what they do not yet know with certainty. Since all recent empirical investigations of succession in large organizations have used a potentially biased measure of performance, and most have used short horizons, it is not surprising that a consistent set of findings about whether a new leader can alter corporate performance has not emerged.

CONCLUSIONS

This study has shown that the performance context of a succession event and the origin of a newly appointed leader moderate the relationship between the succession and its consequences for performance in large cor-

porations. In general, succession conveys negative information to investors. However, they seem to revise their expectations of cash flows upward when outsiders are appointed to high-performing firms.

The study has limitations that temper the strength of its findings. It focused on one background factor and one dimension of organizational context while controlling for size. We did not control for the multitude of other possible background and context factors but assumed their influence would be random. A recent study by Coughlan and Schmidt (1985), however, found that stock prices predicted CEO succession only when a predecessor was less than 63 years old. Another limitation of the present study is that it used chief executives as the units of analysis. Although it is true in most firms that the chief executive exerts the most power of any manager, Hambrick and Mason (1984) asserted that studying entire management teams may increase the predictive strength of a model. Finally, the study followed a stringent decision rule when defining origin. Vancil (1987) suggested a less stringent rule, whereby appointees with one to five years of tenure in an organization were considered outsiders.

Clearly, there are opportunities for future research. Nonetheless, empirical analysis of premises concerning executive background characteristics, organizational context, and corporate size have been long overdue, and the current study made an attempt to test some of those premises.

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APPENDIX

Derivation of Beta^a

$$\text{Beta}_i = \frac{\sum_t (\text{ret}_{i,t} \text{mret}_{3,t}) - \left(\frac{1}{N}\right) \left(\sum_t \text{ret}_{i,t}\right) \left(\sum_t \text{mret}_{3,t}\right)}{\sum_t (\text{mret}_t \text{mret}_{3,t}) - \left(\frac{1}{N}\right) \left(\sum_t \text{mret}_t\right) \left(\sum_t \text{mret}_{3,t}\right)},$$

where

- $\text{ret}_{i,t}$ = log of (1 + return for security i on day t),
 mret_t = log of (1 + value-weighted market return on day t),
 $\text{mret}_{3,t}$ = $(\text{mret}_{t-1} + \text{mret}_t + \text{mret}_{t+1}) \div 3$,^b and
 N = the number of observations for the year.

^a See the CRSP Daily Excess Returns File for additional detail.

^b This is a three-day moving-average market window.

Michael H. Lubatkin is an associate professor of business policy at the University of Connecticut. He obtained his doctorate from the University of Tennessee. His current research interests include corporate diversification, capital markets, mergers, and leadership.

Kae H. Chung is a professor and the chairperson of the Department of Management at Wichita State University. He received his Ph.D. degree from Louisiana State University. His current research interests include Korean management styles, leadership, and statistical quality controls.

Ronald C. Rogers is an associate professor of finance at the University of South Carolina. He obtained his doctorate from Ohio State. His current research interests include capital markets, corporate finance, and diversification.

James E. Owers is an associate professor of finance at the University of Massachusetts. He received his Ph.D. degree from Ohio State. His research interests focus on the implications of organizational structure for corporate financial performance.

ATTENTIONAL DEMAND AND COST RESPONSIBILITY AS STRESSORS IN SHOPFLOOR JOBS

ROBIN MARTIN

TOBY D. WALL

University of Sheffield

Two studies were conducted to test for the effects of attentional demand and cost responsibility on psychological strain. One was a field experiment involving operators of computer-based manufacturing equipment, and the other was a cross-sectional investigation of employees in a wide range of jobs. The results showed increased strain only for those in jobs high on both attentional demand and cost responsibility. Implications for job design for new manufacturing technologies are discussed.

Over the last two decades, the study of job stress has come to occupy a central position in industrial and organizational psychology. Comparative research examining occupational differences on a variety of strain indexes has suggested that employees in blue-collar work are clearly at risk for stress (Cooper & Smith, 1985), apparently in large part because of the demands of machine-minding and automation. French, Caplan, and Van Harrison (1982), for example, in an investigation covering over 20 different groups (including supervisors, policemen, tool and die workers, and physicians), found that levels of somatic complaints, anxiety, and depression were highest among assembly workers and machine tenders. It is thus appropriate for such work to provide a major focus for research.

Attempts to identify features of shopfloor work that cause strain have most frequently focused on factors like repetition, machine-pacing, control, skill use, hours of work, environmental conditions, and social relationships (Caplan, Cobb, French, Van Harrison, & Pinneau, 1975; Frankenhaeuser & Gardell, 1976; Hurrell, 1981; Salvendy & Smith, 1981). Researchers have given some consideration to the demands such work places on human attention (e.g., Cox, 1985; Smith, 1981) but little to the responsibility that

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accompanies it. Three influences combined to encourage us to consider both attentional demand and responsibility as sources of strain among blue-collar employees. First, research has generally implicated both as stressors; second, the emerging literature on computer-based technology has suggested that attentional demand and responsibility will become increasingly significant in shopfloor work; and third, as described in the introduction to the first of the two studies to be presented, preliminary exploratory work pointed to those elements as psychologically important job demands.

Within the broad literature on job stress, several investigators have pointed to attentional demand and responsibility as determinants of psychological and physiological well-being (e.g., Warr, 1987). Payne and Rick (1986), for example, found that strain among anaesthetists and surgeons changed with increases and decreases in allocations of responsibility. Johansson and Aronsson (1984) similarly found strain to be associated with job complexity and responsibility among white-collar employees. Perhaps the most provocative study bringing these two variables together is that reported by Cobb and Rose (1973). They found air-traffic controllers suffered from unusually high levels of hypertension and peptic ulcers, particularly when working in high-density traffic areas. They suggested the joint effect of the high attention required and the high cost of error to human life and aircraft as causes of the high level of strain found. The important insight of this study and of others in the area (Bromet, Dew, Parkinson, & Schulberg, 1988; Clegg, Wall, & Kemp, 1987; Karasek, 1979) is that stressors often occur simultaneously in work situations, and strain may well result from their interactive rather than additive effects (Katz & Kahn, 1978; Landy & Trumbo, 1980).

The more general concept of mental workload, now current in the human factors literature, reflects a similar notion. In an authoritative review of this area, Gopher and Donchin (1986) illustrated the construct effectively by analogy to the task of walking along a plank. People cope easily when a plank is placed on the ground. If it is raised 50 feet in the air, however, making the cost of an error much greater, the same objective task becomes more difficult to perform and more stressful (Gopher & Donchin, 1986: 41–4). The now voluminous literature surrounding the concept of mental workload suggests that it captures a widely applicable notion (for reviews, see Gopher & Donchin, 1986; Moray, 1982; and O'Donnell & Eggemeir, 1986). More specifically, it is reasonable to hypothesize that attentional demand interacts with responsibility to cause psychological strain.

Clearly, attentional demand and responsibility are applicable to, and vary across, all kinds of work. They are thus relevant to understanding stress in shopfloor jobs. Concern over the job and psychological implications of computer-based manufacturing technology has given interest in this issue additional impetus (Carroll, 1981; McCormick, 1981; Wall & Martin, 1987). In many industries the use of such technology is now seen as essential to maintaining competitiveness, and the rate of its adoption is accelerating (Child, 1984; Sharit, Chang, & Salvendy, 1987). Indeed, it has been estimated

that 40 to 50 percent of American employees will deal daily with such technology by the end of the century (Giuliano, 1982). Nevertheless, despite visions of the fully automated, peopleless factory of the future, it is evident that routine use will typically continue to be in the form of human-operated stand-alone systems, or "islands of automation." Numerical control and computer-numerical-control machines, or machining centers, and robotic installations will be the rule, rather than fully computer-integrated manufacturing, at least for the foreseeable future (Corbett, 1987; Valery, 1987; Wall & Kemp, 1987).

Studies of the effects of computer-based manufacturing technology on the work of operators have shown how it can lead to high levels of attentional demand. The machine involved routinely carries out a machining or assembly task, with the operator loading and unloading but spending much of the time monitoring. This consideration led Sharit to suggest that "the primary need for operators will be as monitors" (1985: 48); similarly, Van Cott observed that such technology has "re-arranged man's role from an active element to one of passive monitoring" (1985: 1140), and Sharit and colleagues argued that "many of the components of boredom and stress . . . are based on the fact that these technologies are designed to require minimal (and typically routine) operator intervention, yet their smooth operation depends on the operator's alertness and intelligent response to unexpected difficulties that develop" (1987: 1720).

Similar observations have been made with regard to the responsibility associated with operating computer-based manufacturing equipment. Zicklin (1987), for example, drew attention to this factor in a detailed case study of numerical control (NC) technology: "Operators acknowledged the responsibility they felt to ensure that so expensive a piece of equipment as an NC machining centre, which may have cost \$500,000 in the late seventies, be spared a costly crash because of a malfunction the operator might have prevented" (1987: 460). In the same vein, Sinclair concluded: "The operator is put in a position of assuming heavy responsibilities for what is essentially a monitoring task, where decision points are unpredictable, where the consequences of decisions can be widespread, and where the consequences need to be considered in detail" (1986: 1515). As our first study illustrates, those consequences can be very costly in terms of lost production.

It is thus clear that computer-based manufacturing technology can be associated with high levels of attentional demand and cost responsibility for operators. Nevertheless, effects are not uniform. Various applications of information technology are associated with different levels of demand depending, *inter alia*, on the complexity and reliability of the technology itself, the cost of the materials involved, the number of machines an individual operates, and the recoverability of errors. The emergence of computer-based technology thus provides an important and appropriate context for investigating the psychological effects of those variables. At the same time, it is evident that attentional demand and cost responsibility arise in shopfloor jobs other than those involving computer-based technology. If the two factors of inter-

est are important sources of strain, their impact should also be demonstrable in this larger context.

The two studies described in this article thus investigated attentional demand and cost responsibility as determinants of strain both for operators dealing with computer-based technology and operators dealing with other forms of manufacturing technology. More particularly, following the proposition first put forward by Cobb and Rose (1973), we designed the studies to test the hypothesis that psychological strain results from the interaction of high attentional demand and high cost responsibility, rather than from either factor alone.

STUDY 1: FIELD EXPERIMENT

Methods

Background and respondents. The research was conducted in one plant of a large British electronics company. The 400 shopfloor employees on site were engaged in making printed circuit boards for micro and mainframe computers. Manufacture involved two main types of work: (1) the production of bare boards, with workers using various photographic, chemical, and computer-numerical-control-based processes to create the microcircuitry and drill holes for the subsequent attachment of parts; and (2) the assembly of functional boards, involving the insertion and soldering of components. The data for both studies to be reported came from employees engaged in the first type of work.

Our role within the plant was to advise on the development and implementation of new technology, with particular regard to job design and supervisory and management structures. As independent investigators, we accepted no fees for this work, guaranteed the confidentiality of individual views, and made our reports and recommendations available to both trade unions and management.

The setting for the experiment was the drilling department, where boards were prepared for the subsequent insertion of components through use of computer-numerical-control machines. Employees dealt with over 200 types of boards, each involving the accurate drilling of several hundred holes, for which up to 20 changes of drill bit were required. The 14 people who operated the machines (on two shifts) participated in this study. Their average age was 41 years, their mean length of service was 9 years, and 6 were women.

There were nine computer-numerical-control drilling machines in the department, all of the same technical specification. Each had four parallel drilling heads positioned over a moving base on which the boards were placed. The drill heads moved only in a vertical dimension. The different drilling patterns and automatic changes of the bits, which were stored in pods attached to the base, were achieved by computer control of the base through horizontal dimensions. The operation of the machines involved six main tasks: (1) loading parts, stacked up to four high for each drill head, onto

the table; (2) placing the required drill bits into the pods (there were eight pods per drill head, which meant that for more complex patterns operators had to change bits during the run); (3) loading the program; (4) monitoring the drilling process and rectifying errors by, for example, manually inserting bits not automatically taken up; (5) unloading completed boards; and (6) undertaking visual inspection.

Prior to the experiment, we spent time observing the operators and talking to them as they went about their work. This procedure provided important insights that informed and guided the subsequent study. Of their own volition, operators frequently mentioned the strain of their jobs. The received view was that the strain stemmed from the need for operators to pay close attention to the details of machine operation, particularly when required to run two machines at the same time. Indeed, such double-minding had been a bone of contention between management and trade unions, and the latter had only reluctantly agreed to the arrangement. If the operators had a hidden agenda in cooperating with the research, it was to show that double-minding was undesirable. It was this insight that made us consider attentional demand as a key variable. To us, however, an equally interesting possibility was the responsibility inherent in the work. Although only two people mentioned it as a source of strain, it was clear that operator error could cause very costly losses in production and was a potential stressor. Given the interest in this variable in previous research, we incorporated it into our study without making our focus explicit to those involved.

Research design. The preliminary investigation also revealed two sets of circumstances that jointly made a field experiment possible. First, practices in the department gave rise to jobs characterized by marked differences in attentional demand and cost responsibility. There were four job conditions, described in detail below. Second, the drilling department had a weekly job rotation system, so each operator worked under each of the job conditions. Thus, we were able to use a repeated-measures design to assess the effects of the job types while holding constant both shift and individual difference factors.

The four job conditions in the department reflected three of the four possible combinations of the factors required to test the hypothesis. The first two had the highest level of attentional demand because operators were required to cover two machines simultaneously. In one case (condition A), however, production scheduling practice meant that the boards drilled were all very expensive, multilayer boards with highly complex microcircuitry. Drilling was the final stage of the production process. Misalignment of a hole, selection of a wrong-sized bit, or a range of other errors caused or preventable by an operator would lead to irretrievable damage. The cost of such an error could amount to as much as \$7,000, and cost responsibility was consequently very high. The other case in which operators watched two machines (condition B) was, in contrast, characterized by the drilling of much cheaper boards. Here, drilling was often the first stage of manufacture, with the expensive process of adding circuitry coming later, and the oper-

ators' mistakes could usually be recovered. At worst, an operator error would lead to a few hundred dollars worth of lost production. Cost responsibility was thus much lower than for the first job condition.

The final two job conditions occurring within the department both involved much lower levels of attentional demand than the first two because employees operated only one machine. In both cases, moreover, cost responsibility was low, as only the cheaper types of board were loaded on the machines (as in condition B). We distinguished between the second two job conditions, however, because of a potentially important difference. In one case (condition C), the machines operated like those used in the two jobs previously described. They were programmed to pause at points in their cycle when they picked up or put down drill bits, to help operators make the necessary checks. In the final case (condition D), the program did not include such pauses. Operators thus had to stop the machine at these critical, though predictable, times. Their activity was thus more closely tied into the cycle of the machine itself, a circumstance we refer to as temporal constraint. Operators did not consider this difference in software, which was the result of a specification error made when the machine was originally programmed, to be of particular significance. We separated this factor out here, however, because it could confound the study with regard to its primary focus.

The naturally occurring experimental conditions were thus A, high attentional demand and high cost responsibility; B, high attentional demand with low cost responsibility; C, low attentional demand with low cost responsibility; and D, low attentional demand and low cost responsibility, with additional temporal constraint (see Table 2). Clearly, examination of strain on operators as they moved between these four conditions allowed causal inferences concerning the effects of the job factors involved. Comparing B and C, for instance, would isolate any main effect of attentional demand, and comparing C and D would isolate the effect of temporal constraint. The main hypothesis of this study, however, was that psychological strain results from high attentional demand combined with high cost responsibility. Thus, we predicted that condition A would yield high strain scores and that the other three conditions would yield lower ones. Our research, however, lacked a complete factorial design in that there was no condition combining low attentional demand with high cost responsibility. We discuss this issue and how the second study covers the inherent shortcoming later in this article.

Procedures and measures. We administered a short questionnaire to all operators as they completed each week of work under each of the four job conditions. The questionnaire included five measures of psychological strain; Appendix A shows items for all scales developed for this study. Two 3-item scales measured job-related anxiety and depression ($\alpha = 0.68$ and 0.63 , respectively). We based these two measures on Warr's (1987) model of mental health, which posits two underlying dimensions, positive to negative affect and active to passive orientation. Thus, job-related anxiety, for example, is an active but negative state, and contentment a passive but positive one. Factor analysis we conducted on data from a larger sample ($n = 280$)

yielded a clear four-factor solution totally consistent with the constructs described. We included two single items to measure pressure and worry about damaging boards. The 12-item General Health Questionnaire (Goldberg, 1972, 1978) provided the final measure of strain ($\alpha = 0.67$). This is a self-administered screening test, designed to detect minor psychiatric disorders, that has been shown to be an appropriate general measure of mental health in employed people (Banks, Clegg, Jackson, Kemp, Stafford, & Wall, 1980; Banks & Jackson, 1982; Wall & Clegg, 1981).

Although the focus of this study was on psychological strain, we thought it desirable to also measure other psychological reactions to determine whether stress effects obtained were distinguishable from more general affective responses. We therefore included three short attitude measures: a 4-item scale of job satisfaction ($\alpha = 0.51$) and two 3-item measures of job-related enthusiasm and contentment ($\alpha = 0.68$ and 0.71). The enthusiasm and contentment measures were based on Warr's (1987) model.

Table 1 shows descriptive statistics and average intercorrelations for all the scales. As would be expected, the correlation matrix shows moderate interrelationships among the strain measures and among the measures of satisfaction, contentment, and enthusiasm, with rather weaker, negative associations between the two sets of variables. Few of the correlations, however, reach statistical significance.

Statistical analyses. The data were analyzed by one-way repeated measures analysis of variance using the Genstat package (Rothamstead Experimental Station, 1977). We selected this statistical package because it accommodated the small numbers of missing values that arose through absences at the time of questionnaire administration and failure to check occasional items. Multivariate analyses could not be applied because of the small number of respondents. We used Neuman-Keuls procedures to test for the statistical significance of differences between conditions.

TABLE 1
Descriptive Statistics and Average Zero-Order Correlations
Between Variables in the Field Experiment^{a,b}

Variables	Means	s.d.	1	2	3	4	5	6	7	8
1. Anxiety	6.1	1.3	(.68)							
2. Depression	4.7	1.2	.45	(.63)						
3. Pressure	2.9	0.7	.41	.36						
4. Worry about damage	3.6	0.9	.48	.21	.43					
5. Mental health ^c	8.3	2.4	.64	.31	.37	.46	(.67)			
6. Job satisfaction	11.5	1.4	.30	-.11	-.24	-.05	-.25	(.51)		
7. Enthusiasm	6.8	1.9	-.28	-.10	-.49	-.18	-.36	.58	(.68)	
8. Contentment	8.3	2.3	-.49	-.15	-.38	-.10	-.43	.48	.71	(.71)

^a $N = 14$; r 's $> .53$ are significant at $p < .05$.

^b Entries on the diagonal are average internal reliability coefficients (α) for scales.

^c High scores reflect poorer mental health.

Results and Discussion

Table 2 presents the results of the study. A general point to notice is that all five indexes of psychological strain show statistically significant differences across conditions, whereas the measures of work satisfaction, enthusiasm, and contentment do not. This pattern supports the view that the effects of the job variables in question apply to stress reactions but not to psychological reactions in general and weakens rival explanations invoking general demand characteristics.

The pattern of differences in strain reactions across the four job conditions allows three further inferences concerning more particular causes. First, temporal constraint can be discounted, as there are no significant differences on any measure of strain between conditions C and D. Second, there is no evidence for a main effect of attentional demand, as there are no differences between conditions B and C (or D). As mentioned earlier, if the respondents had any expectation, or vested interest, concerning the results of the study, it was to show that operating two machines simultaneously, with the attendant high attentional demand, was undesirable. The absence of such findings suggests the results were not affected by this demand characteristic. Finally, it is clear that the substantial effects obtained arise from

TABLE 2
Study 1: Psychological Reactions to Four Conditions
of Computer-Numerical-Control Working^a

Variables	Work Conditions				Statistical Analyses		
					Repeated-Measures Analysis of Variance		Neuman-Keuls Comparisons ^b
	A	B	C	D	F	df	
Factors							
Attentional demand	High	High	Low	Low			
Cost responsibility	High	Low	Low	Low			
Temporal constraint	Low	Low	Low	High			
Means for dependent measures							
Anxiety	7.7	5.9	5.6	5.4	8.2**	3,23	A > B,C,D
Depression	5.6	4.3	4.9	4.3	9.4**	3,22	A > B,C,D; C > B
Pressure	3.6	2.7	2.4	2.7	6.2**	3,23	A > B,C,D
Worry about damage	4.5	3.3	3.4	3.2	8.7**	3,27	A > B,C,D
Mental health ^c	9.7	7.8	7.7	7.3	3.7*	3,26	A > B,C,D
Job satisfaction	11.2	12.0	10.9	12.1	1.3	3,27	
Enthusiasm	6.7	7.0	7.0	6.7	0.2	3,24	
Contentment	7.4	8.8	9.1	7.9	2.5	3,24	

^a N = 14

^b Neuman-Keuls comparisons were undertaken only where the overall F is statistically significant ($p < .05$).

^c High scores reflect poorer mental health.

* $p < .05$

** $p < .01$

the high scores recorded under condition A, where work was high on both attentional demand and cost responsibility. Neuman-Keuls procedures confirmed that after working under these job circumstances employees' reports of job-related anxiety, job-related depression, pressure, worry about damaging boards, and general mental health were significantly worse than they were in all other conditions. Thus, our results implicate the combination of high attentional demand and cost responsibility as the cause of the worst levels of psychological strain at this site.

This last finding supports the study's hypothesis, but interpretation is ambiguous. Either, as predicted, the finding reflects the combined effect of high attentional demand and high cost responsibility, or it is a result of high cost responsibility alone. As mentioned earlier, circumstances did not provide the condition (low attentional demand with high cost responsibility) necessary to allow us to distinguish between these two interpretations. The investigation reported next overcomes this difficulty and in so doing offers a second test of the hypothesis covering a wider range of jobs and an alternative methodology.

STUDY 2: CROSS-SECTIONAL STUDY

Methods

Context, respondents, and procedures. The second study was conducted in the same electronics plant described earlier and covered all shopfloor workers engaged in the manufacture of bare computer boards. Typical jobs involved were bonding laminates and copper sheets using presses, photographic production of templates for circuitry, chemical etching of circuitry, and various chemical cleaning processes. Virtually all the jobs were machine-assisted. All employees, 30 percent of whom were women, were skilled or semiskilled; their average age was 41, and their average length of service was 10 years.

Data were collected as part of a larger survey administered by the authors and colleagues, during the respondents' work time, to groups of up to 50 employees. The questionnaire was completed by 130 individuals, representing 83 percent of the workforce and a 97 percent response rate from those available at the time. (We omitted two respondents from subsequent analyses because of extensive missing data.) It is relevant to note that the cross-sectional survey and the field experiment were independent; although administered concurrently, the questionnaires differed. The second questionnaire's purpose was to obtain baseline data against which to assess organizational change more generally. Neither we as investigators nor the respondents themselves were aware of the specific hypothesis it would be used to test.

Measures. Appendix A describes the measures in the questionnaire relevant to the present study. Two scales assessing perceived job characteristics paralleled the key independent variables of the field experiment. *Attentional demand* ($\alpha = .71$) had three items. *Cost responsibility*, covering the

cost of errors for both production and machinery, was also measured by a 3-item scale ($\alpha = .74$). The dependent measures of job-related anxiety, depression, enthusiasm, and contentment and the scale of general mental health were identical to those in study 1. Their internal reliabilities were 0.63, 0.73, 0.73, 0.75, and 0.81, respectively. Job satisfaction was measured using Warr, Cook, and Wall's (1979) 15-item scale ($\alpha = .88$). Finally, pressure was measured by a 3-item scale ($\alpha = 0.74$).

Table 3, which gives descriptive statistics and intercorrelations for all the measures, shows only weak relationships between each of the independent variables and the several dependent variables. There is, however, a consistent pattern of moderate correlations among the dependent variables. Thus, we needed to exercise caution in interpreting univariate analyses where they yielded equivalent patterns of results.

Statistical analyses. The hypothesis of the second study was again that psychological strain results from the combined effect of high attentional demand and high cost responsibility. Researchers usually employ moderated regression analysis (Zedeck, 1971) to test for such interactions. However, recent work by Bobko (1986) has shown this procedure to be inappropriate where the expected effect is for only one particular combination of the independent variables, the high-high condition in this case, as it leads to spurious main effects. Instead, he argued for subgroup analysis with two a priori hypothesis-driven contrast tests. The first is to test for differences between means across all subgroups predicted not to differ on the dependent variable. This procedure will reveal any main or nonspecified interaction effects. The second test is for the difference between the focal group, the group for which an effect is predicted, and all other subgroups combined. Only if the results of the first test are statistically insignificant and the second significant is a hypothesis deemed to be supported.

Applying this rationale required the formation of four subgroups. We achieved that by dividing the respondents at the median for both attentional-demand and cost-responsibility scores. For the first stage of analysis, we tested for differences in mean scores across three of the resultant subgroups, using one-way analysis of variance. The three subgroups included respondents with low scores on one or both of the two independent variables. In the second stage, using *t*-tests, we tested for differences in means between the scores for the focal subgroup (those reporting both high attentional demand and high cost responsibility) and the scores for the other three subgroups combined. Appendix B further discusses this analytic strategy and the supplementary analyses conducted.

Results and Discussion

Table 4 shows the findings for study 2. As for the field experiment, no differences across conditions are evident for job satisfaction, enthusiasm, or contentment. Three of the four strain measures, by comparison, follow the precise pattern predicted. Results from the first stage of analysis, listed in the table as contrast 1, show that when work was low on both attentional de-

TABLE 3
Descriptive Statistics and Zero-Order Correlations Between Variables in the Cross-sectional Study^{a,b}

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Attentional demand	11.9	2.7	(0.71)								
2. Cost responsibility	11.5	3.2	.29	(0.74)							
3. Anxiety	6.8	2.2	.19	.23	(0.63)						
4. Depression	6.4	2.4	-.07	.07	.49	(0.73)					
5. Pressure	8.4	3.2	.25	.13	.51	.43	(0.74)				
6. Mental health ^c	10.1	3.7	.00	.17	.53	.53	.27	(0.81)			
7. Job satisfaction	61.0	13.9	.16	-.11	-.33	-.38	-.31	-.44	(0.88)		
8. Enthusiasm	10.8	2.6	-.12	-.07	-.21	-.43	-.19	-.42	.38	(0.73)	
9. Contentment	9.9	2.7	.00	.08	-.34	-.23	-.25	-.35	.32	.45	(0.75)

^a $N = 128$; r 's $> .17$ are significant at $p < .05$; for r 's $> .23$, $p < .01$.

^b Entries on the diagonal are internal reliability coefficients (α) for scales.

^c High scores reflect poorer mental health.

TABLE 4
Study 2: Psychological Reactions to Four Conditions of Work^a

Variables	Subgroups ^b				Statistical Analyses			
					Contrast 1— B,C,D		Contrast 2— A vs. B,C,D	
	A	B	C	D	F	df	t	df
Factors								
Attentional demand	High	High	Low	Low				
Cost responsibility	High	Low	High	Low				
Means for dependent measures								
Anxiety	7.9	6.5	6.6	5.9	<1.0	2,77	3.9***	117
Depression	6.8	6.2	6.7	6.2	<1.0	2,76	0.9	116
Pressure	9.9	8.6	7.3	7.7	1.3	2,81	3.6***	122
Mental health ^c	11.1	9.2	10.3	9.7	<1.0	2,77	2.0*	117
Job satisfaction	59.0	64.4	60.2	59.6	1.3	2,83	0.8	126
Enthusiasm	10.8	10.4	10.6	11.1	<1.0	2,76	0.1	114
Contentment	10.4	9.4	9.4	10.1	<1.0	2,77	1.2	114

^a N = 128

^b Numbers per subgroup are 42, 23, 29, and 34.

^c High scores reflect poorer mental health.

* $p < .05$

*** $p < .001$

mand and cost responsibility or high on only one or the other of these characteristics, no demonstrable relationship with reported strain emerged. Mean scores across these three conditions did not differ significantly statistically. Contrast 2, with results for the focal subgroup, however, shows quite clearly that when operators experienced jobs as high on both attentional demand and cost responsibility, scores for psychological strain were markedly higher. Operators perceiving this combination of work characteristics reported much more pressure, greater job-related anxiety, and worse general mental health than did others. Except for the finding for job-related depression, these results replicate those from the field experiment and support the view that it is the combination of high attentional demand and high cost responsibility, rather than either job characteristic alone, that causes stress reactions.

The above findings demonstrate effects for psychological strain but not for more general affective responses. Given the interrelationships among the strain measures (Table 3), however, it remains unclear whether the results reflect three separate outcomes or a more general reaction. To answer this question we subjected the data to further analysis. For each of the three dependent variables (pressure, anxiety, and mental health) we conducted regression analyses in which the other dependent variables were entered into the equation followed by a dummy-coded variable for membership in the focal condition. These showed an independent effect for job-related anxiety ($p < .04$) but not for pressure. Inclusion of the other two dependent variables fully accounted for the effect for mental health. This result was, of

course, to be expected, as the mental health scale used (the GHQ) is designed as a general measure covering both anxiety and pressure. Together, these findings suggest that the prime effect of high attentional demand combined with high cost responsibility is to increase job-related anxiety.

SUMMARY AND DISCUSSION

The findings we have described suggest that shopfloor work combining high attentional demand with high cost responsibility causes psychological strain. Employees working under these conditions reported greater job-related anxiety, more pressure, and worse general mental health than their counterparts in jobs characterized by other combinations of these independent variables. Moreover, neither main nor additive effects accounted for the results. Employees, it seems, coped with either high attentional demand or high cost responsibility without discernible strain, but not with both. In other words, there was an ordinal interaction between attentional demand and cost responsibility.

Two features of the research strengthen this conclusion. First, we obtained the findings in two separate but complementary studies using very different methodologies. The focused field experiment was based on manifest differences in the independent variables and short exposure to resultant work conditions and, by the nature of its design, provided a sound basis for causal inference. The cross-sectional investigation, in contrast, used perceived measures of the job characteristics assessed, covered longer periods of exposure, included a much wider range of jobs, and allowed a more complete test of the predicted interaction effect. The replication of findings through such methodologically different studies indicates that the findings are robust.

The second strength of the present research arises from the absence of effects for job satisfaction, job-related enthusiasm, or contentment. This absence suggests the results obtained are specific to psychological strain, rather than representative of a more generalized affective response. Equally important, the absence of those effects weakens alternative explanations invoking demand characteristics or, for the cross-sectional study, common method variance. Indeed, demand characteristics are unlikely to have played a significant part in the investigations, and this is so for two further reasons. First, in neither study were respondents aware of the specific hypothesis under investigation; and second, in study 1, where the respondents might have wished to demonstrate an effect of attentional demand, we did not obtain such an effect. Given the particular difficulties of field research, these two studies combine to provide high internal validity.

We turn now to the wider implications of the findings. An initial point to note is that they highlight a potential source of strain in blue-collar jobs that hitherto has been relatively neglected. Two main approaches have guided research on shopfloor work and psychological well-being: (1) job stress research, which emphasizes different independent variables, such as

repetition, pacing, and control (e.g., Smith, 1981), and (2) job design theory, which emphasizes parallel job properties, such as variety and autonomy, and does not explicitly include psychological strain among its outcome variables (e.g., Hackman & Oldham, 1976). Even those who have extended traditional job design theory to cover strain and mental health have not considered the attentional and responsibility demands of shopfloor work (Alcalay & Pasick, 1983; Kornhauser, 1965; Wall, Kemp, Jackson, & Clegg, 1986). Both approaches might benefit from accommodating the additional job characteristics considered in this research.

A second general point concerns the form of explanation underlying existing psychological theory and research on shopfloor work. To date, main effects models have dominated such research, with some associated (but weakly supported) corollaries about the moderating effects of individual differences playing a role. Outside the human performance and social support literatures, little attention has been paid to interactional, or combinatorial, formulations, especially ones that focus on the ordinal interactions, or "superadditive effects" (Landy & Trumbo, 1980), between environmental demands. The present research, along with Karasek's (1979) work and recent research by Broadbent (1986) and Clegg and colleagues (1987), suggests such an approach may usefully complement the more traditional perspective.

From a practical point of view, the results have a number of implications. Most obviously, they suggest a need to consider the levels of attentional demand and cost responsibility in shopfloor jobs. Where high levels occur separately, there seems little cause for concern. However, when high levels on both factors occur together, action may be warranted. A number of strategies might be adopted. Where high cost responsibility is unavoidable, attentional demand can be limited either through the use of automatic monitoring devices or by designing jobs to limit the amount of monitoring required of individuals. Correspondingly, where attentional demand is high, cost responsibility can often be reduced, either through job design choices or by technological means. The particular method employed to avoid the cooccurrence of high attentional demand and high cost responsibility is in many ways incidental and will obviously vary according to circumstances. It is the underlying principle that is important.

This principle becomes particularly salient in the context of new manufacturing technology. Although some existing shopfloor jobs undoubtedly combine high attentional demand with high cost responsibility, the large majority do not. The history of job design is one of work simplification and minimization of the opportunity to make costly errors. Many applications of computer-based technology, in contrast, lead to jobs characterized by precisely the conditions of present concern. As discussed in the introduction to this article, the operation of such technology often requires close attention under conditions in which errors are very costly. More generally, it can promote an unforgiving or unkind work environment as "defined by the fact that it is not possible for a man to correct the effects of inappropriate variations in performance before they lead to unacceptable consequences" (Ras-

mussen, 1986: 25). Such circumstances, however, are not an inevitable outcome of computer-based manufacturing technology. Psychological findings of the kind reported here could contribute to the design and implementation of such systems and thus minimize their potentially harmful effects.

Of course, our discussion of the wider implications of the present findings rests on the assumption of their generalizability. There is some support for this view. The findings in the field experiment relate to computer-numerical-control technology typical of that widely used in manufacturing; the cross-sectional study showed equivalent results for a broad range of technology and jobs; and the general literature implicates attentional demand and responsibility as joint determinants of psychological strain in other contexts. Nevertheless, we cannot yet confidently assume external validity. To the best of our knowledge, this is the only investigation of attentional demand and cost responsibility as stressors in blue-collar work. As such, it needs corroboration from other shopfloor studies. Without such support, we cannot rule out the possibility that the present findings are unique to the particular setting, where, because of the nature of the product, the need for close monitoring and the cost of operator error could be unusually marked.

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APPENDIX A

Measures

Field experiment. The questionnaire used in this study included the following five scales and two single-item measures. Each item had an appropriately worded 5-point response format.

The **anxiety** scale had three items: How much of the time this week has your job made you feel—tense? frustrated? anxious?

The **depression**, **enthusiasm**, and **contentment** scales followed the same wording, and their respective items were miserable? depressed? gloomy?; keen? lively? enthusiastic?; calm? contented? relaxed?

The **job satisfaction** scale had four items: To what extent over the last week did you feel—frustrated? (reverse-scored), satisfied? interested? challenged?

The two single-item measures of **pressure** and **worry about damaging boards** were: To what extent do you feel under pressure at work? To what extent do you worry about damaging a board?

Cross-sectional study. The additional measures used in the cross-sectional study are described below. Each item had a 5-point response format.

Attentional demand was measured by three items: To what extent—do you have to concentrate while working? do you need to inspect your work closely? do you have to react quickly to prevent problems arising?

Cost responsibility was also measured by three items: To what extent—could an error on your part cause immediate and expensive damage to production? are you responsible for valuable products? are you responsible for valuable machinery?

The **pressure** scale had three items: To what extent—are you under constant pressure at work? do you find work piles up faster than you can complete it? do you have to work faster than you would like?

APPENDIX B

Statistical Analyses

Bobko's (1986) procedure for analyzing interaction effects is appropriate in many circumstances. However, it does have a potential weakness. The first stage of analysis is based on a partial data set and involves a two-tailed test of statistical significance, whereas the second stage makes use of the total data set and a one-tailed test. As a consequence, where there is a direct but weak effect of one or both independent variables on the outcome variable, the procedure is biased in favor of yielding a predicted interaction effect. The weak direct effect could fall just short of statistical significance in stage one, using the less sensitive two-tailed test with the reduced data set, but exceed conventional levels at stage two, with the more sensitive one-tailed test on the larger data set. In this way, a main effect could be erroneously interpreted as an interaction effect (Cronbach, 1987).

To guard against this particular danger, we subjected the data to supplementary statistical analysis, conducting regression analyses in two stages for each dependent variable. At the first stage, limited to respondents in the three subgroups predicted not to differ, we entered the two continuous independent variables first into the equation, followed by dummy-coded scores for group membership. The prediction was that group membership would account for no significant variance in the dependent variable above that accounted for by the main effects. In the second stage, drawing on the total data set, we entered the two independent variables into the regression equation followed by a dummy-coded score for membership in the focal condition, high attentional demand or high cost responsibility. The prediction here was that group membership would account for variance in the dependent variable above that explained by the main effects. In essence, this procedure is moderated regression analysis modified to test more directly the particular form of interaction predicted. The results from these supplementary analyses were equivalent to those from the primary analyses and consequently are not reported in the text.

Robin Martin obtained his Ph.D. degree from the Open University. He is a research fellow at the Medical Research Council and Economic and Social Research Council (MRC/ESRC) Social and Applied Psychology Unit, University of Sheffield, England. His research interests include social psychology in general and social influence processes more particularly, and the psychological and organizational implications of computer-based manufacturing technology.

Toby Wall obtained his Ph.D. degree from Nottingham University. He is the assistant director of the MRC/ESRC Social and Applied Psychology Unit, University of Sheffield, England. His research interests cover information technology in medical and manufacturing organizations; work design; employee motivation, mental health, and well-being; and applied research design.

ABILITY AND EFFORT ATTRIBUTIONS: DO THEY AFFECT HOW MANAGERS COMMUNICATE PERFORMANCE FEEDBACK INFORMATION?

KATHLEEN WATSON DUGAN
Butler University

Patterns of performance feedback communication were studied using laboratory simulations. The data indicate that a consistent relational communication pattern, or script, was associated with feedback sessions on poor performance. However, managers' initial attributions of effort or ability as the reason for subordinates' poor performance influenced how they defined their role within the script and thereby controlled the flow of interaction. The nature of the control patterns dyad members used was related to the degree of change in initial attributions, salary decisions, and performance assessments.

Appraising performance and conducting feedback sessions with subordinates is regarded as an essential managerial activity. One important area of research on appraisal concerns attribution processes and their influence on performance judgments (Dobbins, 1985; Feldman, 1981; Heerwagen, Beach, & Mitchell, 1985; Weiner, 1985) and on the feedback interaction between manager and subordinate (Donnellon, Gioia, & Sims, 1983; Gioia & Poole, 1984; Gioia & Sims, 1986).

Drawing on attribution theory, Green and Mitchell (1979) developed a model that attempts to describe the processes of evaluating and responding to subordinate performance. This model suggests that managers (1) engage in a diagnosis phase during which they try to determine the cause of poor performance and (2) decide what feedback message to convey. Support for this model has been fairly consistent (Green & Liden, 1980; Green & Mitchell, 1979; Mitchell & Kalb, 1982; Wood & Mitchell, 1981). However, the model does not incorporate the fact that the diagnosis phase may be an interactive process in which feedback allows an exchange of information through which a manager can seek out the cause of a subordinate's success or failure. For example, a major finding of the Gioia and Sims study was "that managers do not often make overt, verbal attributions when personally interacting with subordinates; rather they engage in attribution-seeking behavior, and have the subordinates make verbal attributions" (1986: 221). Thus, information provided during a feedback session can modify a manager's preconceived performance attributions.

Of particular interest are feedback sessions that occur when subordinates are performing poorly. The diagnostic task of the manager faced with poor performance is to determine why in order to select an appropriate

corrective response (Heerwagen et al., 1985; Weiner, 1985). This study therefore had two primary interests: (1) whether managers' initial attributions of the causes for poor performance influence the kind of feedback communication pattern that develops in feedback sessions and (2) what effect feedback sessions have on managers' subsequent attributions, performance evaluations, and salary decisions.

THEORETICAL BACKGROUND AND RESEARCH QUESTIONS

Attributions

Research on the perceived causes of performance has suggested that attributions vary along an internal-external dimension. People believe that either characteristics of an individual or of a situation account for performance level (Rotter, 1966). Respectively called internal attribution and external attribution, these beliefs define the locus of attribution. Causal attributions have been further categorized on the basis of stability and controllability (Weiner, 1979). Ability and task difficulty are relatively stable over time, and specific effort and luck are relatively unstable over time. Controllability refers to the degree of influence that an individual can exert over a cause. Effort is considered controllable, and a person's mood or luck, uncontrollable. The combined dimensions of locus, stability, and controllability result in an eight-cell matrix. Figure 1 shows the eight attributions, which are based on Gioia and Sims's (1986) translations of Weiner's (1979) attributions to categories appropriate to organizational settings. The primary focus in this study was on the internal attributions of specific effort and ability and the external attribution of task difficulty. I chose these because Weiner (1974) found that effort, ability, and task difficulty were the most salient attributions for poor performance.

Research has indicated that a manager's behavior toward a subordinate will differ depending on whether the manager makes an internal or external attribution of the cause of poor performance (Green & Mitchell, 1979). For example, laboratory studies involving student subjects have concluded that when managers attribute subordinate performance to internal causes (ability or effort), they are more likely to hold the subordinates responsible for that

FIGURE 1
The Eight-Cell Attribution Matrix^a

	Internal Locus		External Locus	
	Stable	Unstable	Stable	Unstable
Uncontrollable	Ability	Mood	Task difficulty	Luck
Controllable	Typical effort	Specific effort	Supervision	Dependence

^a Adapted from Gioia and Sims (1986:199).

performance (Dobbins, 1985; Dobbins, Pence, Orban, & Sgro, 1983). Green and Liden (1980) found that more punitive policy sanctions were chosen for the same performance level when attributions were made to internal rather than external causes.

Within the internal attribution category, there are important distinctions. Even though both ability and effort are seen as dispositional, ability is a stable disposition that, as Hastorf, Schneider, and Polefka (1970) suggested, has greater primacy as a perceived internal cause of behavior than does effort. Research has shown that effort attributions lead to a more favorable reaction to good performance than ability attributions (Weiner & Kukla, 1970). Rothbart (1968) found that supervisors chose more severe disciplinary actions when they believed a subordinate performed poorly because of lack of effort rather than lack of ability. Knowlton and Mitchell (1980) found that effort attributions led to more extreme performance evaluations, both positive and negative, than did ability attributions. These studies were based on managerial attributions without feedback interaction between managers and subordinates.

The first research question this study investigated was the following: Prior to discussion with subordinates, do managers who attribute a subordinate's poor performance to lack of effort make more punitive salary decisions than managers who attribute a subordinate's poor performance to lack of ability?

The present study sought to investigate the relationship between managers' initial attributions regarding the cause of subordinates' performance and the nature and effect of manager-subordinate feedback communication on subsequent performance evaluations. A premise was that it is common for managers and subordinates to enter a feedback discussion with differing perceptions of the cause of poor subordinate performance. Typically, managers initially attribute behavior to an internal cause, such as ability or effort, and subordinates attribute their behavior to an external cause, such as luck or task difficulty (Green & Mitchell, 1979; Heerwagen et al., 1985; Jones & Nisbett, 1972; Mitchell, 1982; Weiner, 1985). This study manipulated attributions so that managers attributed poor performance to internal causes of effort or ability and subordinates attributed it to the external cause of task difficulty.

Communication Patterns Related to Attributions

This study also focused on the actual verbal behaviors of managers and subordinates during feedback sessions. Mitchell (1982) pointed out that behaviors have not often been studied as dependent variables in attribution research; Gioia and Sims (1986) is a notable exception. In studies that have looked at the consequences of attribution, the dependent variables have tended to be feelings, attitudes, and expectations (Kelley & Mikela, 1980). Mitchell (1982) argued that although it is more difficult to study actual behavior, measures of attitudes and expectations are poor substitutes for action.

Not only is it important to focus on actual communication behavior rather than on attitudes and expectations, but the methodology used must account for the reciprocal influence of managers' and subordinates' language on each other's choice of behavior. Sims and Manz (1984) emphasized the need to study leadership as a "mutual-causal" relationship in which both leader and subordinate influence each other in a system of reciprocal determinism. Their study indicated that the performance of subordinates influenced leaders' verbal behavior. They called for future investigations in which the behaviors of both managers and subordinates would be viewed simultaneously as both causes and results.

My previous research (Watson 1982a,b) suggested a methodology that captures reciprocal determinism through the study of communication exchanges. The model for analysis suggested in that work uses a transaction—the paired exchange of two messages—as the basic unit of analysis. This methodology patterns the interactive behavior of individuals in terms of probabilistic recurring sequences. Thus, the data obtained reflect the probability that a subsequent behavior will occur, given knowledge of the immediately preceding behavior. The method allows analysis of reciprocal influence by comparing a subordinate's response to a manager's verbal behavior with the manager's response to that same verbal behavior exhibited by the subordinate.

The system used to categorize the verbal behavior studied can focus on either the content or the relationship dimension of the communication. The content dimension focuses on information or issues. The relationship aspect focuses on linguistic form, specifically, the manner in which a communicator interprets his or her relationship with the other person in the discussion in terms of levels of control (Watzlawick, Beavin, & Jackson, 1967). Gronn (1983) used linguistic analysis to show how talk is central to the achievement of control. He concluded that "the power to control must be worked at linguistically and worked at never-endingly as an ongoing everyday activity" (Gronn, 1983: 20). The methodology suggested by my previous work (Watson, 1982b) combined with a relational control categorization system allowed analysis of the reciprocal influence process in terms of control. Gioia and Sims (1986) found that verbal behavior differed with poor and good performance. This study held constant both the subordinates' attribution and performance level, focusing on expected differences in the form, not the content, of verbal behavior when managers made internal attributions to effort rather than to ability. Thus, the second research question was: In response to subordinate poor performance, does a manager's attribution to lack of effort rather than to lack of ability affect the relational communication patterns of the dyad members during performance feedback sessions?

Communications Patterns Related to Role

Hewes (1979) argued strongly that the study of communication behavior should not disregard *who*—manager or subordinate—engages in a behavior. My more recent study (Watson, 1982a) found significant differences between

leader and subordinate communicative behaviors during goal setting. Donnellon and colleagues (1983) suggested that there are differences between managers and subordinates because certain roles carry with them an implied message about how to behave. In this study, subjects were expected to play out the "script" associated with the role of manager or the role of subordinate (Donnellon et al., 1983). Drake and Moberg (1986) suggested that people use language to calibrate their power in a dyad. They argued that the form of language, as opposed to the content alone, is role relative, citing the example of a doctoral student using a different form of language when making a request of a department head or a typist. Those arguments motivated the study's third research question: Do the relational communication patterns of managers and subordinates differ as a function of their roles?

Communication Patterns Related to the Interaction of Role and Attributions

Martinko and Gardner (1987) proposed an interactive model of the leader-member attributional process, arguing that both leaders and members make causal attributions and that the simultaneous influence of both sets of attributions must be accounted for in explaining subsequent behavior. For example, they predicted a subordinate response of performance deficits when a leader has attributed poor performance to lack of ability but a subordinate has made an attribution to task difficulty. In contrast, if a leader attributes poor performance to task difficulty and a subordinate attributes it to lack of ability, the subordinate response is learned helplessness (Martinko & Gardner, 1982). Thus, outcomes differ depending on how role and attribution are combined.

Linking Martinko and Gardner's (1987) interactive attribution model with the linguistic form approach of Drake and Moberg (1986), I would expect both dyad members' roles and their initial attributions to temper how they use language to define their power in a dyad. That is, leaders have a unique role to play, but their attribution of subordinate performance to lack of effort or to lack of ability will temper their definition of the leadership role. Their role during a feedback session may differ depending on whether they think they can change the subordinate's future performance or not. In the first case, the attribution would be to an unstable cause like effort; in the second, to a cause that appears less subject to the subordinate's control, such as ability. For the leader, that attribution refines the script for the feedback session; however, as Martinko and Gardner (1987) suggested, the subordinate's attribution simultaneously defines the script. These theoretical ideas induced this study's fourth question: Do initial attributions have an effect on the manner in which a manager and subordinate define their roles within a dyad?

Post-interaction Changes

Some previous research has suggested that leniency in performance assessments and salary decisions is likely after face-to-face interaction be-

tween managers and subordinates (Cascio, 1982; Carroll & Schneier, 1982; Gioia & Sims, 1986). If the leniency effect occurs, managers will give higher performance ratings, award higher salaries, and shift attributions to external causes following interactions with subordinates. When performance is poor, feedback sessions give subordinates an opportunity to offer a self-serving rationale for their performance. Gioia and Sims's (1986) empirical study found the leniency effect following interaction sessions under conditions of both subordinate failure and success.

In this study, it was expected that both parties' attributions would change as a consequence of the information exchanged during a face-to-face interaction. Subordinates were expected to communicate things about their behavior that were inconsistent with the managers' attributions because the subordinates' preinteraction attribution would be to task difficulty, an external cause. If each of the parties in a dyadic interaction acts as a causal influence on the other, managerial attributions to task difficulty and subordinate attributions to the internal causes of ability or effort should increase. Thus, the fifth research question was whether the relational communication patterns used during feedback sessions affect initial manager and subordinate attributions and performance and salary decisions.

METHODS

Subjects and Procedures

Subjects for the study were 52 M.B.A. students enrolled in a graduate-level organizational behavior course. The 26 subjects assigned the role of manager had a minimum of one year full-time work experience in which they had provided performance feedback to at least two subordinates. They were randomly paired with the remaining subjects to form 26 manager-subordinate dyads.

Each dyad reported to an office-type setting equipped with videotape facilities. All subjects received a scenario that gave background information on both their partner's and their own roles. This information was always the same. The second page gave data on the subordinate's performance relative to three goals set six months earlier. All scenarios indicated that the subordinate had fallen short of accomplishing the goals. Because people have a natural tendency to attribute their own failure to external causes (Jones & Davis, 1965), all subordinates received scenarios attributing poor performance to task difficulty. Because observers tend to attribute another's failure to internal causes (Heerwagen et al., 1985; Jones, 1979), managers were randomly given scenarios suggesting either a lack of effort or a lack of ability as an attribution.

Each manager and subordinate dyad then met to discuss the subordinate's performance. Both individuals were instructed that by the end of the performance review session, the manager must announce a salary decision. Subjects were told that a half hour was available for the feedback session. The sessions were allowed to end naturally, with most of the dyads using the

full 30 minutes; the shortest time was 22 minutes. All the feedback sessions were videotaped.

Measures

Pretest. After reading the scenario but prior to the discussion, each manager and subordinate filled out a pretest questionnaire that asked them to rate the subordinate's performance on the objectives and indicate the extent to which they agreed that each of eight attributions (Figure 1) was a likely cause of the subordinate's performance. The response format was a 7-point scale ranging from 1, strongly disagree, to 7, strongly agree. Managers were asked to indicate the salary they would recommend for the subordinate, given as parameters that a 5 percent increase was considered average and a 12 percent increase was considered outstanding. Subordinates were asked to indicate what salary they felt they deserved under the same parameters.

Communication. All videotaped data from the feedback sessions were coded with a relational coding scheme developed by Ellis (1976). Ellis drew on Bateson's (1958) conceptualization of relational communication as a function of attempts to be dominant (one-up), attempts to be submissive (one-down), and attempts to be equivalent (one-across). The system coded each act—an uninterrupted speech—into five mutually exclusive and exhaustive categories defining the type of control message conveyed: (1) Dominance is an attempt to severely restrict another's behavioral options. Examples are an abrupt topic change, disconfirmation of a previous comment, an ideational or personal challenge, and refusal of personal support. (2) Structuring is an attempt to restrict another's behavioral options but to leave some options open, such as disagreement. Examples include opinions asserted in response to a request for an opinion, ideational extensions, procedural directions, disagreement, and justification. (3) Equivalence is an attempt at mutual identification; it is an interactional mode in which an individual does not seek to control the flow of interaction. Expressions of understanding and conditional agreement are examples. (4) Deference is willingness to relinquish some behavioral options to another while retaining some choice of options. Simple agreement and seeking information or an opinion are examples. (5) Submissiveness is willingness to relinquish behavioral options to another and to retain little choice. Offering personal support and not extending an idea are examples. Ellis (1976) and Watson (1982a) have fully described the coding system, and Folger and Sillars (1977) and Ellis (1976) have supported its validity.

Two research assistants were trained in the use of the categorization system through the use of videotaped data from a similar research study on performance feedback (Watson, 1983). Guetzkow's (1950) formula yielded an intercoder reliability on 150 units of that data of .86 ($p < .01$). One trained coder then coded all data for this study directly from the videotapes. After half the data had been coded, a test for reliability indicated that it remained at an acceptable level (.81, $p < .01$). The total number of acts produced in the

26 dyadic feedback sessions was 1,711. Each act was assigned a code to indicate speaker, with 1 for managers and 2 for subordinates.

The coded data were transformed into matrixes in which successive pairs of communication acts formed two-way contingency tables, each cell representing the frequency and transitional probability of the occurrence of act B given act A. When speaker is not taken into consideration, under the five-category coding scheme all possible transactions result in a 25-cell matrix. Of the 1,711 coded acts, the coder assigned only 12 to the dominance and submissiveness categories. Therefore, the 5 acts coded for dominance and the 7 acts coded for submissiveness were recoded as structuring and deference, respectively. This is consistent with the three-category relational communication coding schemes originally conceptualized by Bateson (1958), used by Rogers and Farace (1975), and reviewed in the relational communication literature by Parks (1977). The resultant 9-cell matrix eliminates a large number of cells with zero observations.¹ In all, 26 matrixes were compiled, one for each dyad.

Each dyad matrix represents the mapping of transactional patterns as they unfolded over the course of the performance feedback session. Each message is treated as both a response to the preceding message and a stimulus for the message that follows. The total number of transactions for each dyad is the total number of acts minus one.

Post-test questionnaires. Following the videotaped sessions, all subjects filled out post-interaction questionnaires. The post-test questionnaire asked them to rate the subordinates' performance on the objectives and indicate the degree to which they felt the subordinates' poor performance was due to lack of ability, typical effort, specific effort, job difficulty, luck, dependence on others, management supervision, and recent mood. Managers were asked to indicate the salary decision they made, and subordinates were asked to indicate the salary decision they felt they deserved.

Analysis of Communication Data

Differences in communication patterns were analyzed by comparing the data matrixes that portrayed the relational control patterns the dyads used. I created a composite of all interaction data from the feedback sessions (total transactions = 1,685) and then divided it into subsets; the division depended on the research question under examination.

Differences between attribution conditions. Interaction data for the 13 dyads whose managers entered the feedback sessions attributing poor performance to lack of ability were combined into one composite matrix ($N = 959$); all interaction data for the 13 dyads whose managers entered with attributions to lack of effort were combined to form a second composite matrix ($N = 726$). I tested for differences between interaction patterns under the ability and effort attributions using Kullback, Kupperman, and Ku's

¹ For an example of the data configuration, see Table 2.

(1962) test for the homogeneity of several realizations of Markov chains. This method tests the null hypothesis that transition matrixes of data subsets are not significantly different from the transition probabilities of the complete matrix. To conduct the test, I compared each of the two data subgroups, the ability-attribution condition and the effort-attribution condition, with all the data combined to obtain a chi-square statistic. Thus, the observed behavior was compared with the expected behavior, represented by the matrix of transition probabilities with attribution condition and speaker disregarded.

If significant differences between subgroups emerged, I compared the probabilities of responses given particular antecedent behaviors. Differences between the transitional probabilities were tested cell-by-cell with a significant difference-in-proportion test (Ferguson, 1971: 160–162). Differences in transitional probabilities indicated which transactions contributed to lack of homogeneity between subgroups.

Differences due to role. Differences in how managers differentiated their roles in the dyads were tested using the role differentiation analysis outlined in my previous research (Watson, 1982b). This methodology allows identification of who is initiating a given communicative behavior and the nature of their partner's response. Role differentiation analysis can indicate if the communicative responses of a subordinate differ from those of a manager.

Methodologically, I tested manager-subordinate differences by creating subsets called speaker matrixes. In the first matrix, the antecedent act is always a manager's and the subsequent act is always subordinate's ($N = 842$); in the second, a subordinate's act is antecedent and a manager's is subsequent ($N = 843$). The two matrixes each had half the transactions (1,685) produced in the feedback sessions. I compared the manager and subordinate matrixes using the same statistical analyses used for the ability and effort matrixes.

Differences due to the combined effect of attribution and role. To test whether managers behave differently when their initial attribution is to effort rather than to ability, I created four speaker matrixes, a set for the effort-attribution dyads and a set for the ability-attribution dyads. A test of homogeneity was used (Kullback et al., 1962) to compare all four matrixes; a significant chi-square would indicate that the subsets of data that simultaneously reflected role and attribution presented a pattern that significantly differed from the pattern of the feedback sessions in general. Given significant differences across all four matrixes, I performed further homogeneity tests to determine if roles were differentiated within each of the attribution conditions. The two speaker matrixes of the effort-attribution dyads were compared to all the data for those dyads; likewise, a homogeneity test was conducted for the ability-attribution dyads.

RESULTS

Manipulation Checks

A check on the attribution information given in the scenarios was made by comparing the pretest questionnaire data of managers in the ability and

TABLE 1
Managers' Pretest Attributions and Performance Assessments

Variables	Conditions ^a		<i>t</i>
	Ability Attribution	Effort Attribution	
Ability	5.38	2.77	5.49***
Typical effort	3.08	4.31	-2.65*
Specific effort	3.38	5.31	-3.90***
Task difficulty	5.15	4.38	1.40
Luck	2.23	3.31	-3.08**
Dependence	4.62	4.62	0.00
Supervision	4.69	4.00	1.29
Mood	4.07	4.54	-1.13
Performance	3.08	3.38	-1.03

^a *N* = 13 in both the ability- and effort-attribution conditions.

* *p* < .05

** *p* < .01

*** *p* < .001

the effort conditions. Table 1 shows the differences. As expected, managers making attributions to ability gave significantly higher ratings to lack of ability as the cause of subordinate performance. Managers in the effort-attribution condition gave significantly higher ratings to typical effort, specific effort, and luck as causal influences on subordinate performance. There were no significant differences for attributions to job difficulty, dependence on others, supervision, or recent mood.² The mean scores in Table 1 indicate the overall pattern of attributions. The manipulated attribution had the highest mean value in each condition, but task difficulty, dependence, and supervision also had high mean scores. This result is not surprising because the goals portrayed in the scenarios were difficult, and accomplishment of one goal required assistance from a support department. A likely reason the mean score on typical effort was lower than those on task difficulty and dependence for managers whose attribution was to effort was that the scenarios given to all subjects indicated the subordinate's work history showed both good and poor performance. Only managers in the effort-attribution condition received information about specific effort in the last six months, which influenced them to rate typical effort significantly higher than did the managers in the ability-attribution condition.

Importantly, there were no significant differences between the ability- and effort-attribution conditions on rating subordinate performance on the three objectives. This absence of differences was expected since the scenarios indicated the same level of goal accomplishment; only the attributions

² The recent-mood questions were dropped from further analysis because many subjects indicated they were unable to answer since they had no information regarding recent mood.

differed in the two scenarios. An overall mean performance rating of 3.23 on a 7-point scale indicates that the manipulation of performance level was successful.

Question 1: Differences in Salary Decisions

A comparison of the pretest salary decisions reveals an average 5.78 percent salary increase for the ability scenario and a 4.54 percent increase for the effort scenario. A one-tailed *t*-test ($t = 1.64$, $df = 24$, $p = .056$) shows the results were in the expected direction: when poor performance was attributed to lack of effort, decisions were more punitive. This finding is consistent with earlier findings by Rothbart (1968), Weiner and Kukla (1970), and Knowlton and Mitchell (1980).

Question 2: Differences in Communicative Behavior

Differences in dyadic communication patterns under the effort- and ability-attribution conditions were tested by analyzing profiles of the interactions during the videotaped feedback sessions, as coded with the relational coding scheme. Composite matrixes of the data for the two conditions were tested for homogeneity (Kullback et al., 1962). Table 2 shows the results of the analysis, which supported the assumption of homogeneity ($\chi^2 = 6.86$, $df = 6$, n.s.).

The transitional probabilities in the data subsets are the same as would be expected of all subjects. The performance feedback sessions appeared to be similar whether the subjects acting as managers attributed subordinates' poor performance to lack of effort or to lack of ability. This finding is contrary to expectations.

Question 3: Differences in Communication Patterns Due to Role

Table 3 shows the data array for the speaker matrixes, which reflect role but not attribution condition. A test for the homogeneity of the speaker matrixes revealed significant differences between manager and subordinate responses ($\chi^2 = 31.73$, $df = 6$, $p < .001$), indicating that the role held by a dyad member influences choice of communication response. Because the role differences were significant, I analyzed the differences by comparing the transitional probabilities. The far right of Table 3 shows the results of this analysis. When their partner initiated a structuring act, managers were significantly more likely to respond with structuring ($z = -1.59$, $p < .05$) than their subordinates, and subordinates were significantly more likely to respond with deference when compared with their managers ($z = 1.75$, $p < .05$). Previous research has considered managers' structuring responses to be a resistance pattern (Courtright, Millar, & Rogers-Millar, 1979) in which a manager counters a subordinate's attempt to control an interaction with a like attempt at structuring. In contrast, the structuring-deference interaction is a compliance transaction (Courtright et al., 1979). Watzlawick and colleagues (1967) saw such interactions as representing the maximum differ-

TABLE 2
Comparison of Interaction Patterns: Ability- Versus Effort-Attribution Conditions^a

Antecedent States	Subsequent States							
	Ability-Attribution Condition				Effort-Attribution Condition			
	Structuring	Equivalence	Deference	Total	Structuring	Equivalence	Deference	Total
Structuring								
Frequency	224	79	251	554	170	43	206	419
Transitional probability	.4043	.1426	.4531		.4057	.1026	.4916	
Equivalence								
Frequency	75	19	13	107	44	17	8	69
Transitional probability	.7009	.1776	.1215		.6377	.2464	.1159	
Deference								
Frequency	258	8	32	298	203	11	24	238
Transitional probability	.8658	.0268	.1074		.8529	.0462	.1008	
Totals	557	106	296	959	417	71	238	726

^a Homogeneity of matrices: $\chi^2 = 6.86$, $df = 6$, n.s.

TABLE 3
Speaker Analysis of Interaction Patterns: Differences in Roles^a

Antecedent States	Subsequent States								χ^2
	Subordinate Responses				Manager Responses				
	Struc- turing	Equiv- alence	Defer- ence	Total	Struc- turing	Equiv- alence	Defer- ence	Total	
Structuring									
Frequency	183	59	240	482	211	83	217	491	
Transitional probability	.3797	.1224	.4979		.4297	.1283	.4420		
Equivalence									
Frequency	53	22	8	83	66	14	13	93	
Transitional probability	.6386	.2651	.0964		.7097	.1505	.1398		
Deference									
Frequency	254	11	12	277	207	8	44	259	
Transitional probability	.9170	.0397	.0433		.7992	.0309	.1699		
Total	490	92	260	842	484	85	274	843	
					</				

^a Homogeneity of subordinate and manager response matrices: $\chi^2 = 31.73$, $df = 6$, $p < .001$.

^b Scores were calculated from a significant difference-in-proportion test (Ferguson, 1971: 160-162). A positive z indicates the probability of subordinate response is higher than the probability of manager response; a negative z indicates the opposite.

* $p < .05$

** $p < .01$

*** $p < .001$

ence in power and control. In this case, a manager defined a relationship (structuring), and a subordinate accepted it (deference).

Equivalence is a neutralizing or control-leveling act that circumvents either the acceptance or assertion of relational control (Parks, 1977). When a subject initiated equivalence, structuring was the most likely response from the other party. However, subordinates were significantly more likely than their managers to extend equivalence with more equivalence ($p = .2651$ vs. $.1505$). Work by Ellis (1979) has suggested that equivalence-equivalence transactions generate long chains of interactions of a sort that leaderless group members apparently find the most comfortable for discussing ideas. Consistent with my previous work (Watson, 1983), in this study attempts to generate chains of neutralized interactions were much more characteristic of subordinates than of managers.

When deference was initiated, the most likely response was structuring, but subordinates were significantly more likely than managers to use this response. When a manager deferred, the subordinate nearly always ($p = .9170$) took the opportunity to attempt to control the interaction. Interestingly, managers were significantly more likely than subordinates to respond to deference with more deference.

In summary, the results show that the roles individuals hold influence how they define their control of relationships. These results support arguments of Donnellon and colleagues (1983) that the roles of manager and subordinate carry with them an implicit message on how to behave.

Question 4: Role Differences Within Attribution Conditions

In order to test for an interactive effect due to the combination of role and attribution condition, I divided the data into subsets by attribution, with speaker designation preserved. Table 4 shows results for this analysis.

A test for homogeneity across all four matrixes indicated that the combined effect of role and attribution resulted in significant differences in communication patterns ($\chi^2 = 44.76$, $df = 18$, $p < .001$). These results indicate that unique combinations of managerial attribution (ability or effort) and role (manager or subordinate) influence relational communication patterns. Because there were significant differences across all four matrixes, I conducted further analyses to test whether the same role differentiation occurred within dyads under the ability- and effort-attribution conditions.

A test for homogeneity between the speaker matrixes (matrixes 3 and 4) revealed no significant differences between managers' and subordinates' response patterns when managers' attributions were to effort ($\chi^2 = 10.04$, $df = 6$, *n.s.*). These results indicate no role differentiation; managers and subordinates responded similarly to each other and did not differentiate their communicative behavior within the categories coded.

However, a test for homogeneity in the ability-attribution dyads showed significantly different response patterns for managers and subordinates ($\chi^2 = 27.87$, $df = 6$, $p < .001$). To interpret these role differences, I compared the transitional probabilities of subordinate and manager responses. Results

are on the far right of Table 4. The role differences within the ability-attribution dyads are very similar to the differences between managers and subordinates in the dyads as a whole (Table 3). The same pattern of significantly greater resistance on the part of managers to their partners' attempts to structure emerges, combined with greater subordinate compliance. Subordinates also used equivalence-equivalence transactions significantly more often than managers. Responses to deference were also the same. These results indicate that when managers attribute poor performance to lack of ability, they assert their superior role by resisting subordinates' attempts to control interactions. In dyads under the ability-attribution condition, subordinates play a one-down role by deferring to the managers' attempts at control. Previous research has found equivalence-equivalence transactions, which subordinates used significantly more than managers, to be associated with a subordinate role (Watson, 1983).

Another method of comparing compliance and resistance transactions for the ability-attribution dyads was looking within the speaker matrixes shown in Table 4. Subordinates complied with their manager's attempts at structuring significantly more than they resisted them, as shown in matrix 1 by transitional probabilities of .5053 versus .3604 ($z = 2.652, p < .01$).³ In contrast, managers resisted more than they complied, as shown in matrix 2 by transitional probabilities of .4502 versus .3985 ($z = -0.925, p = .18$). For matrix 2, however, the difference was not significant.

In summary, the communicative responses of managers and subordinates were differentiated when managers attributed poor performance to lack of ability but not when managers attributed poor performance to lack of effort.

Question 5: Attribution Change

Ability condition. It was expected that attributions regarding performance and salary decisions would change as a result of the feedback sessions. There appeared to be no significant change in attributions before and after interactions for the subordinates. For the managers, only attributions to dependence on others increased after the interaction. The attributions made prior to the feedback session remained essentially the same. However, both parties did change their perception of the subordinate's performance on the objectives. After the feedback sessions, managers who attributed the poor performance to ability felt that the subordinates had performed significantly better than their original assessments had suggested, and the subordinates felt they had performed significantly worse than their original assessment suggested. However, there was no significant change in the managers' salary decisions.

The last column of Table 5 compares managers' and subordinates' per-

³ A standard z-score was calculated from a significant difference-in-proportion test for dependent observations (Ferguson, 1971: 163).

TABLE 4 (continued)

Antecedent States	Matrix 3: Subsequent States of Subordinates				Matrix 4: Subsequent States of Managers			
	Struc- turing	Equiv- alence	Defer- ence	Total	Struc- turing	Equiv- alence	Defer- ence	Total
Structuring								
Frequency	81	21	97	199	89	22	109	220
Transitional probability	.4070	.1055	.4874		.4045	.1000	.4955	
Equivalence								
Frequency	21	8	4	33	23	9	4	36
Transitional probability	.6364	.2424	.1212		.6389	.2500	.1111	
Deference								
Frequency	118	7	6	131	85	4	18	107
Transitional probability	.9008	.0534	.0458		.7944	.0374	.1682	
Total	220	36	107	363	197	35	131	363

^a Homogeneity of all four matrices: $\chi^2 = 44.76$, $df = 18$, $p < .001$.

^b Homogeneity of ability matrices: $\chi^2 = 27.87$, $df = 6$, $p < .001$.

^c Scores were calculated from a significant difference-in-proportion test (Ferguson, 1971: 160-162). A positive score indicates the probability of subordinate response is higher than the probability of manager response; a negative score indicates the opposite.

^d Homogeneity of effort matrices: $\chi^2 = 10.04$, $df = 6$, n.s.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 5
Ability-Attribution Condition: Attributions, Performance, and Salary Decisions

Variables	Means				<i>t</i>			
	Managers		Subordinates		Pretest Versus Post-test		Managers Versus Subordinates	
	Pretest	Post-test	Pretest	Post-test	Managers	Subordinates	Managers	Post-test
Ability	5.38	4.85	2.38	2.54	1.46	-0.41	5.79***	
Typical effort	3.08	2.54	1.77	1.92	1.72	-0.49	2.13	
Specific effort	3.38	3.31	1.77	2.54	0.14	-1.81	1.33	
Task difficulty	5.15	4.77	5.69	5.62	0.96	0.19	-1.37	
Luck	2.23	3.23	4.23	4.85	-1.84	-1.26	-2.50*	
Dependence	4.62	5.77	5.92	5.54	-2.56*	1.24	0.43	
Supervision	4.69	3.92	4.15	4.08	1.81	0.17	0.23	
Performance	3.08	3.77	5.46	5.00	-3.32**	2.52*	-4.38***	
Salary decision	5.78	6.15			-2.13			

* $p < .05$

** $p < .01$

*** $p < .001$

ceptions after the feedback sessions. Ideally, the interactions should have clarified how well the subordinates performed on the objectives and the causes of their poor performance. An absence of significant differences between managers and subordinates would indicate such clarification. However, the subordinates, significantly more than the managers, still felt that luck had had a major impact on their poor performance and that they had performed significantly better than their managers felt they did. The managers still felt that lack of ability was a causal factor in poor performance, an attribution not shared by their subordinates. Apparently, for the ability-attribution dyads the feedback sessions did not facilitate convergence of opinion on how well the subordinates performed.

Effort-attribution condition. Table 6 presents the comparison of attributions on performance and salary decisions for managers and subordinates in the effort-attribution condition. As in the ability-attribution dyads, both managers and subordinates significantly changed their assessments of the subordinates' performance on objectives. After the feedback sessions, managers felt subordinates had performed significantly better than their prior assessments had indicated, and subordinates felt they performed significantly worse. The major difference for the effort dyads is that the interaction apparently brought about changes in attributions regarding performance. Managers and subordinates changed both specific and typical effort attributions. After the interaction, managers attributed poor performance to effort significantly less than they originally had, and subordinates attributed their performance to effort significantly more. Thus, the feedback session influenced both parties to change their assessments. Subordinates in the effort dyads also significantly increased attributions to management supervision after the feedback sessions. The interaction process apparently made the subordinates feel that managerial supervision influenced performance more than they originally thought. Most important, after the interaction, managers in the effort-attribution dyads significantly increased the salary decision.

The last column of Table 6 compares managers' and subordinates' perceptions after the feedback sessions. Managers, but not their subordinates, felt that lack of specific effort on the objectives had been a causal factor in poor performance. Subordinates, significantly more than their managers, perceived luck as having had a major impact on their performance. However, manager and subordinate opinions converged regarding performance: they did not see performance on the objectives as differing significantly.

DISCUSSION

This study explored the relationship between initial attributions regarding poor performance, the nature of relational communication patterns during performance feedback sessions, and post-interaction changes in attributions, performance assessments, and salary decisions. When role differences were not considered; relational communication patterns were consistent regardless of whether the managers' attributions were to subordinates' lack of effort or lack of ability. This homogeneity was contrary to expectations.



TABLE 6
Effort-Attribution Condition: Attributions, Performance, and Salary Decisions

Variables	Mean Scores						<i>t</i>	
	Managers			Subordinates			Pretest Versus Post-test	
	Pretest	Post-test	Post-test	Pretest	Post-test	Post-test	Managers	Subordinates
Ability	2.77	2.54	3.15	2.89	3.15	0.76	-1.03	-1.04
Typical effort	4.31	3.31	2.46	1.46	2.46	2.94*	-2.45*	1.53
Specific effort	5.31	4.08	2.92	1.62	2.92	3.41**	-2.56*	2.29*
Task difficulty	4.38	5.00	5.62	5.89	5.62	-1.86	1.00	-1.60
Luck	3.31	3.08	5.15	5.77	5.15	0.61	1.30	-3.50**
Dependence	4.62	5.00	5.62	6.00	5.62	-1.81	1.10	-1.30
Supervision	4.00	4.46	4.77	3.62	4.77	-1.15	-2.84*	-0.55
Performance	3.38	4.15	4.54	5.38	4.54	-6.32***	3.81**	-1.59
Salary decision	4.54	5.85				-3.05**		

* $p < .05$

** $p < .01$

*** $p < .001$

In retrospect, these results are not surprising viewed in light of the findings of Donnellon and colleagues on consistency in performance feedback scripts. They argued that there "appears to be a consensual script for performance appraisal, with some distinctive variation (i.e., two tracks) according to the level of the performer (good or poor) being reviewed" (Donnellon et al., 1983: 20). The stability of both poor performance and subordinate attribution to task difficulty as conditions may account for the high level of consistency in the scripts used by the subjects in this study.

The finding of significant differences for the third and fourth research questions indicates that role makes a difference in relational communication patterns but that the kind and extent of the difference depend on managerial attribution. If role were the only factor influencing relational communication patterns, the same role differences would have been significant for the effort- and ability-attribution conditions. Instead, significantly different manager-subordinate roles emerged only when the manager in a dyad attributed the subordinate's poor performance to lack of ability.

In the ability-attribution dyads, managers resisted and subordinates complied with their partner's attempts to control the flow of interaction through structuring. This manager-resistance, subordinate-compliance pattern (Courtright et al., 1979) is similar to the "tell-and-sell" approach to performance feedback (Maier, 1958), which is characterized by managerial dominance asserted through frequent interruption; the response to a subordinate's opinion is assertion of the manager's own opinion (resistance). As a tell-and-sell interview proceeds, the formality between manager and subordinate increases, emphasizing differences in roles (Maier, 1958). The problem with this approach is that it encourages a "yes man" philosophy and results in dependent, docile behavior on the part of subordinates (Latham & Wexley, 1981). In a previous study (Watson, 1983), I found that this combination of manager resistance and subordinate compliance characterized feedback sessions in which subordinates reported that they perceived the managers as unsuccessful at providing relevant performance feedback.

In contrast to the ability-attribution dyads, in the effort-attribution dyads the communicative exchange was without significant role differences, with attempts at control of the relationship alternating between the manager and subordinate. In the effort-attribution dyads, both managers and subordinates were more likely to comply with rather than to resist their partners' structuring attempts. Looking within the speaker matrixes in Table 4 indicates this pattern. For the subordinates (matrix 3), the difference is not significant but in the expected direction, as shown by transitional probabilities of .4874 versus .4070 ($z = 1.204, p = .11$). The managers (matrix 4) complied significantly more than they resisted, as shown by transitional probabilities of .4955 versus .4045 ($z = 1.428, p = .08$). These findings are consistent with Watzlawick and colleagues' concept of "meta complementarity" as a means of control by which "A lets or forces B to be in charge of him" (1967: 69). In this case, through compliance with subordinate structuring, managers assume a quasi-deferent position in an effort to let the subordinates assert their

authority. The managers still maintain power because they control the situation through seeking behavior in which they suggest a course of action in the form of a question. This pattern is consistent with Gioia and Sims's (1986) finding that managers engage in attribution-seeking behavior, particularly when dealing with failure. They concluded that managers were less threatening and provoked less defensive responses from subordinates using this conversational technique to facilitate finding out what they wanted to know.

This communication patterning characterizes a "problem-solving" approach to performance feedback (Maier, 1958) that maximizes subordinate involvement. The equal use of equivalence-equivalence transactions by managers and subordinates in the effort dyads also represents a problem-solving approach. Ellis (1979) concluded that equivalence-equivalence transactions contribute to an atmosphere of inquiry and freedom to participate that is critical to the generation of information. The conclusion of this study was that both the lack of role differentiation and the nature of the interaction patterns contributed to a more open method of interaction under the effort-attribution condition than under the ability-attribution condition.

The results of the post-interaction analyses supported the idea that communication patterns influence subsequent attribution changes and performance assessments. Managerial attributions to lack of ability were associated with a controlling communication style and subsequent lack of change in initial attributions and salary decisions. Hastorf and colleagues (1970) argued that an original attribution to ability is resistant to change since ability is considered more dispositionally stable than effort. Previous work by Zander (1961) found group discussion and participation (problem-solving) facilitated attitude change much more than the opinion of an expert (tell and sell). For the ability-attribution condition, the controlling, directive communication patterning of the managers further reinforced the stable attributions of ability and task difficulty against change.

Research has indicated that altering attributions from stable to unstable causes raises expectations that goals can be achieved (Anderson, 1983; Zoeller, Mahoney, & Weiner, 1983). Managers who attribute subordinate poor performance to lack of effort, an unstable cause, may be more open in a feedback process because they believe they can change a subordinate's level of effort more readily than they can change ability. The higher expectation of future success may result in a more problem-solving approach in the communication process. This problem-solving mode was associated with greater convergence on attributions and actual performance, and the managers making effort attributions significantly increased the original salaries they had decided on. There may have been greater room for change since the subordinates in the effort-attribution dyads originally received more punitive salary decisions. However, the leniency effect produced by face-to-face interaction (Cascio, 1982; Gioia & Sims, 1986) may have been related to the nature of the face-to-face interaction and attribution shifts. Only in the effort dyads did the managers' and subordinates' opinions on actual performance converge; both parties changed their view on the

strength of specific and typical effort attributions. It may be the problem-solving style of interaction that creates the leniency effect as it influences shifts in performance assessment and attribution.

Weiner (1985) provided further support for the concept that attributions influence communication patterning. He related causal structure to emotions and the dynamics of action, arguing that outcomes of success and failure generate emotion, independent of attribution. Success is associated with happiness and failure is related to frustration and sadness, regardless of the cause of an outcome. This argument is consistent with Gioia and Poole's (1984) concept that a distinctive track of a general script for performance appraisal exists for managers giving feedback to poor performers.

However, the attribution of causality further refines choices of emotion (Weiner, 1985). Recent studies (Brown & Weiner, 1984; Covington & Omelich, 1984; Jagacinski & Nicholls, 1984) have reported that failure attributed to low ability is linked to shame-related affects like disgrace, embarrassment, and humiliation, whereas failure attributed to lack of effort is linked to guilt-related affects (guilt, regret, and remorse). Hoffman (1982) and Wicker, Payne, and Morgan (1983) have documented that shame-related emotions give rise to withdrawal and inhibit motivation but guilt-related emotions promote approach behavior, retribution, and motivational activation. Those findings are consistent with the behavior patterns exhibited in this research study. Managerial communication patterns were autocratic and controlling when a manager attributed poor performance to lack of ability but were more problem-solving and open when the causal attribution was lack of effort.

This research study extended previous work on the influence of attributions on behavior in a number of ways. First, the methodology focused on the reciprocal influence process by using transactions as the units of analysis. Previous work on attribution and behavior has primarily focused on the mean usage of verbal behavior categories. Gioia and Sims (1986) broadened the scope of such research by analyzing the sequential probability of various subordinate responses to one category of managerial behavior, attribution request. In this research, however, the total pattern of interaction under varying attribution conditions was compared by testing the homogeneity of the matrixes.

Second, the coding system used here was based on relational control rather than on the content of the verbal behavior. If Gronn's (1983) contention that talk accomplishes administration by alternately tightening and loosening administrative control is correct, relational control coding schemes may offer new insights into communication's influence on attributions and behavior.

A third contribution is that this study found differences in communication and resultant changes in performance assessment, attribution, and salary decisions with many variables held constant. The subordinates all had the same initial attribution; both managerial attributions were to internal causes; and initial managerial performance assessments were not significantly different. Although differences in communication may be likely

when subordinates fail and when they succeed (Gioia & Sims, 1986), the results of this study indicate differences in communication due to the attributions made regarding one performance condition.

Finally, the results of this study suggest an alternate explanation for the leniency effect. Gioia and Sims, taking a social-information-processing viewpoint, suggested that leniency may actually be a "negotiated accuracy effect," which they found under both good and poor performance conditions. However, this study found that such negotiated accuracy arose more when managers attributed poor performance to lack of effort. Managers' communication patterns and their subsequent leniency in post-interaction performance assessments and salary decisions and manager-subordinate congruence on attributions reflect the effect. Leniency was less marked under the ability-attribution condition; managers raised performance assessments, but congruence on attributions and performance between managers and subordinates did not occur. Thus, the nature of communication patterns may affect a dyad's ability to generate jointly an accurate assessment of the causes of performance.

Some limitations of this research should be noted. This study suggested that a problem-solving mode of interaction during feedback sessions may result in high leniency. It is also possible that leniency was less marked in the ability-attribution condition because the initial attribution was stable or because there was an interaction effect between initial attributions and communicative patterning. Further tests of how the nature of an interaction relates to leniency are necessary; for example, problem-solving and tell-and-sell interactions might be compared.

Regarding the external validity of the results, I have a degree of confidence that the M.B.A. students acted as they would have in their jobs (the subjects attended evening classes while working full-time in career-oriented positions). The more important question about external validity relates to the manipulation of preinteraction attributions. Were these attributions significantly different from attributions formed over an extended period of observing subordinate performance? DeVader, Bateson, and Lord (1986) concluded that empirical research findings in performance appraisal generalize from the laboratory to the field, but the normal interpretive process used to generate attributions in the field may not be the same as that in a lab situation explicitly requiring subjects to make attributions. More research on this issue is certainly needed.

Differences between manager and subordinate communication patterns developed over time and the patterns in this experiment may also constrain generalizability. Over time, such patterns may become so entrenched that attributions may have little impact on interactions. The contexts of situations would also be likely to influence the stability and nature of communication patterns.

It is not expected that the videotaping influenced the interactions. Wiemann (1981) showed that knowing they were being taped did not affect subjects' responses.

CONCLUSIONS

This study found that although a consistent relational communication pattern, or script, was associated with feedback sessions on poor performance, a manager's initial attribution could influence the role within the script the manager chose. Under the ability-attribution condition, managers differentiated their roles from their subordinates', but under the effort-attribution condition, such differentiation did not occur. Thus, an initial attribution may influence a manager's choice of role definition and thereby how he or she will control the interaction during a feedback session. If managers see poor performance as due to lack of effort, they may maintain control through questions implying deference, such as "What do you think the reason is?" instead of through overt structuring statements like "I think the reason is. . . ." Differences in the communication patterns were associated with subsequent changes in attributions, performance assessments, and salary decisions.

In summary, the most important findings of the study were (1) When managers originally attribute poor performance to lack of effort, communicative behavior during performance feedback sessions is not highly role-bound and is characterized by problem-solving interaction patterns. Managers and subordinates in these dyads changed their initial attributions regarding lack of effort and moved toward agreement on actual performance levels, and managers significantly raised the salaries they had originally decided on. (2) When managers originally attribute poor performance to lack of ability, they control communicative behavior during performance feedback sessions more than managers making effort attributions. The communication has a tell and sell quality, with clear differentiation of manager and subordinate roles. Leniency regarding salary decisions did not occur in the ability-attribution dyads, and managers and subordinates neither agreed on actual performance levels nor significantly changed their initial attributions.

The results of this study indicate that initial attributions influence the openness of the communication process during performance feedback sessions. If communication patterns influence the negotiated accuracy that takes place in face-to-face interaction, research like this can identify patterns that facilitate manager-subordinate agreement on the causes of poor performance. Although this study was preliminary, it demonstrated that a preconceived attribution, regardless of its accuracy, will influence verbal behavior in a manner that may not facilitate an effective performance feedback process.

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Kathleen Watson Dugan earned her Ph.D. degree from the University of Utah. She is an associate professor of management at Butler University. Her current research interests include interpersonal communication, influence processes, and leadership.

EFFECTS OF PROCEDURAL AND DISTRIBUTIVE JUSTICE ON REACTIONS TO PAY RAISE DECISIONS

ROBERT FOLGER
MARY A. KONOVSKY
Tulane University

We conducted a survey to examine the impact of distributive and procedural justice on the reactions of 217 employees to decisions about pay raises. Distributive justice accounted for more unique variance in satisfaction with pay than did procedural justice, but procedural justice accounted for more unique variance in two other measures of attitudes about the employing institution and its authorities, trust in supervisor and organizational commitment. We discuss what our results imply about the nature of justice in organizations and the distributive-procedural distinction.

As Greenberg (1987) noted, growing interest in procedural justice has superseded organizational researchers' previous neglect of this issue, placing it alongside distributive justice, or equity (Adams, 1965), as a salient research issue. *Distributive justice* refers to the perceived fairness of the amounts of compensation employees receive; *procedural justice* refers to the perceived fairness of the means used to determine those amounts (cf. Folger, 1977). Because procedural justice has been neglected until recently, there is virtually no organizational research addressing a fundamental question—namely, whether either type of justice is more closely related to some criterion variables than to others.

Research in legal and political contexts has suggested that procedural justice is more closely related to the evaluation of system or institutional characteristics, whereas distributive justice is more highly related to the evaluation of specific outcomes. For example, Tyler and Caine (1981) found that perceived procedural justice accounted for unique variance in evaluations of government leaders and institutions beyond that contributed by distributive justice, whereas the converse was not true. Tyler (forthcoming) reported data in which procedural justice significantly predicted assessments of legitimacy and support for legal authorities, but distributive justice did not.

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Other legal and political studies have shown a similar relationship between procedural justice and support for leaders or institutions, but they have also provided evidence that outcome satisfaction is more strongly related to distributive than to procedural justice. For example, Tyler, Rasinski, and McGraw (1985) found that distributive justice accounted for almost twice as much variance in outcome satisfaction as did measures of procedural fairness. From an analysis based on structural equations modeling, Tyler (1984) reported a significant path coefficient between distributive fairness and outcome satisfaction, whereas the path from procedural fairness to outcome satisfaction was not significant.

After reviewing this research, Lind and Tyler concluded that "procedural justice has especially strong effects on attitudes about institutions or authorities, as opposed to attitudes about the specific outcome in question" (1988: 179). In addition, they offered the following interpretation of the data: "In making leadership or institutional evaluations people are taking a long-term perspective on membership within a group. With personal satisfaction they are reacting to a single decision" (1988: 224). Lind and Tyler's conclusions thus suggest the hypothesis that procedural justice is more highly related to institutional evaluations that require a long-term perspective, like organizational commitment, than it is to satisfaction with the outcome of specific decisions. The latter may result from a short-term perspective and be less stable.

Although evidence for the differential effects of procedural and distributive justice in the legal and political domains is substantial, virtually no evidence bearing on this issue has been gathered in workplaces. One previous study, a survey of over 2,000 federal employees by Alexander and Ruderman (1987), examined the relative contributions of distributive and procedural justice by constructing predictor measures that represented those two forms of justice. Two scales in that study's survey, evaluation of supervisor and trust in management, were criterion measures similar to the leader-institution support measures that have been examined in legal and political settings. The contribution of the procedural predictors was substantially greater than that of the distributive indexes; R^2 s for evaluation of supervisor were .21 and .03; and R^2 s for trust in management were .11 and .05.

Despite this evidence for the differential effects of procedural and distributive justice, Alexander and Ruderman's study is problematic in terms of both the predictor and the criterion variables used. The criterion variables did not include pay satisfaction, which previous research has suggested might be a key indicator of differential impact by procedural and distributive justice. Because such outcome satisfaction measures typically have not shown the type of result Alexander and Ruderman obtained but rather the reverse pattern (a stronger contribution of distributive justice), their inclusion and the demonstration of contrasting patterns would have helped to rule out plausible alternative explanations, such as that the procedural predictor was better measured.

The predictor shortcoming stemmed from the use of data originally collected by other investigators not interested in distributive and procedural justice and not theoretically informed about the nature of those constructs. For example, one of the predictor variables that Alexander and Ruderman put in the procedural justice set was a two-item measure, labeled performance appraisal fairness, whose first item referred to appraisals as "generally . . . done fairly here." Respondents might have interpreted "done fairly" as meaning that the outcomes, rather than the procedures, were fair. The second item was directly related to distributive rather than procedural justice; it asked respondents whether their last rating "was about what it ought to have been."

In addition to Alexander and Ruderman's research, other studies examining perceptions of performance appraisal systems have also failed to use measures constructed with a clear distinction between distributive and procedural justice in mind. Perceptions concerning appraisal systems are relevant to the more general topic of reactions to allocation decisions, which has been the focus of the justice literature. Unfortunately, the literature on procedural justice has not informed the research on performance appraisals. Landy, Barnes, and Murphy (1978), for example, found that opportunities for employees to express their feelings when evaluated predicted a measure of the perceived fairness and accuracy of a performance evaluation (cf. Dipboye & de Pontbriand, 1981). That research, however, examined only a small number of the potential components and consequences of procedural fairness.

To study procedural justice more explicitly than has past research, we examined the results of Greenberg's (1986) findings. He addressed open-ended questions about perceived fairness to experienced managers, asking them to recall critical incidents about performance appraisals used to make pay and promotion decisions. Greenberg's analysis identified a distributive and a procedural factor. The former consisted of two items that assessed the contingent relationship between performance and a recommended salary raise or promotion. The procedural factor consisted of the following five items describing rater behavior: soliciting input prior to an evaluation and using it, two-way communication during an interview, the ability to challenge or rebut an evaluation, rater familiarity with a ratee's work, and consistent application of standards.

Each of those procedural items represents a category of appraiser behaviors that collectively might be called the components of procedural justice. Greenberg's study not only revealed more components than the earlier research on performance appraisal, but also linked those components to theories about procedural justice (Leventhal, Karuza, & Fry, 1980; Thibaut & Walker, 1978). We considered those theories in constructing a scale of the components of procedural justice containing items relevant to Greenberg's categories. We used another set of predictors to assess distributive justice. Our hypotheses were that procedural justice would be more strongly related

to attitudes about institutions and their authorities than would distributive justice, whereas distributive justice would be more strongly related to pay satisfaction than would procedural justice. Decisions about pay raises seemed an ideal context for testing such hypotheses because raises are an individual outcome that is especially salient to employees. In addition, the procedures associated with pay raise decisions presumably have important institutional implications; these procedures may, for instance, be seen by employees as reflecting institutional values.

Our hypotheses addressed issues beyond the scope of Greenberg's (1986) research, which examined only the antecedents of procedural justice, not its consequences. Our hypotheses about the consequences of distributive and procedural justice were based on Lind and Tyler's (1988) conclusions regarding citizen attitudes in legal and political contexts. Our objective was to see whether findings from the legal and political arenas would generalize to organizational settings.

METHODS

Respondents

First-line employees of a privately owned manufacturing plant in the south central United States were surveyed. All 217 people who received the survey completed it (62% of the company's employees, responding voluntarily). Women constituted 45 percent of the group. The average respondent was 34 years old, had 14 years of education, and had worked at the company for 5 years.

Procedures

Employees took part in the survey during company time. Over a period of one week in September 1986, small groups were called off their jobs each hour to fill out questionnaires at a central location. Respondents were instructed to think about the practices their supervisors had used to determine their most recent salary increase, which had been awarded in April 1986. We also recorded the percentage of increase employees' raises represented from company records.

Although the company had not instituted a uniform, formal system of performance appraisal ratings, supervisors were instructed to use the annual inflation rate (based on the Consumer Price Index) as the standard for the size of the raises awarded to average performers, with raises for superior and inferior performers being adjusted around this standard. The official policy was for supervisors to inform subordinates of the size of their raise in private, individual meetings held annually, but no records existed to verify whether such meetings had occurred or what the content of the meetings had been. It was unknown, for example, whether employees had received explanations of the basis for the decisions.

Predictor Measures

Measures of the components of procedural justice were derived through principal axis factoring (varimax rotation) of the 26 procedural items on the questionnaire. We developed the 26 items by referring to existing literature that has examined different elements of procedural fairness (e.g., Greenberg, 1986; Lind & Tyler, 1988). Table 1 shows the results of the factor analysis of the procedural justice items. Items loading above .40 on a factor were unit-weighted and averaged as a measure of a particular procedural component. Four factors, labeled feedback, planning, recourse, and observation, emerged with content consistent with Greenberg's results. We eliminated a fifth factor with low reliability and a marginal eigenvalue.

Two items measured the perceived fairness of the pay raise decision: "How fair do you consider the size of your raise to be?" and "To what extent did your raise give you the full amount you deserved?" We summed these items to form a distributive justice index. Two additional measures related to distributive justice were also included. One measure assessed the perceived favorability of employees' raises in light of their expectations. Dipboye and de Pontbriand (1981) demonstrated the importance of this variable as a predictor of opinions toward performance appraisal. We patterned a second measure after Greenberg's (1986) distributive factor and assessed the contingency of the relationship between performance and pay, asking "To what extent was the size of your raise related to your performance?" These variations allowed us to assess the predictive power of alternative conceptualizations of distributive justice.

Criterion Measures

The short form of the Organizational Commitment Questionnaire developed by Mowday, Steers, and Porter (1979) and the raise subscale of the Pay Satisfaction Questionnaire developed by Heneman (1985) were included as criterion measures. We assessed employees' trust in their supervisors by the scale developed for that purpose by Roberts and O'Reilly (1974).

Control Measures

Two other variables, the percent of salary increase (raise) and a personality trait measure of negative affectivity (NA), were also included. We measured negative affectivity with a 10-item scale developed by Watson, Clark, and Tellegen (1988). This trait measure reflects an individual's disposition to respond negatively regardless of the situation. Watson, Pennebaker, and Folger stated that negative affectivity may therefore "operate as a substantial nuisance factor in many areas of research" (1987: 141). They cited as an example that "presumed measures of job stress or dissatisfaction can be expected to correlate strongly with NA," and suggested that "it is advisable to measure the NA levels of respondents whenever feasible" (1987: 145-146). Because negative affectivity may contaminate true relationships be-

TABLE 1
Factor Analysis of Procedural Justice Items

Items ^a	Factors ^b				Unnamed ^c
	Feedback	Planning	Recourse	Observation	
1. Was honest and ethical in dealing with you	.78	.17	.16	.16	.25
2. Gave you an opportunity to express your side	.71	.05	.16	-.01	.03
3. Used consistent standards in evaluating your performance	.68	.29	.20	.17	.05
4. Considered your views regarding your performance	.67	.27	.23	.10	-.03
5. Gave you feedback that helped you learn how well you were doing	.64	.38	.11	.08	.11
6. Was completely candid and frank with you	.60	.39	.16	.11	.32
7. Showed a real interest in trying to be fair	.55	.40	.18	.20	.32
8. Became thoroughly familiar with your performance	.52	.27	.15	.44	-.01
9. Took into account factors beyond your control (R)	-.50	-.36	-.17	-.22	-.10
10. Got input from you before a recommendation	.46	.16	.21	.08	-.39
11. Made clear what was expected of you	.45	.02	.08	.32	.00
12. Discussed plans or objectives to improve your performance	.15	.75	.02	.13	-.11
13. Review, with your supervisor, objectives for improvement	.27	.54	.36	.07	.16
14. With your supervisor, resolve difficulties about your duties and responsibilities	.18	.51	.37	.21	.15
15. Obtained accurate information about your performance	.39	.48	.13	.30	.21
16. Found out how well you thought you were doing your job	.40	.46	.01	.18	-.19
17. Asked for your ideas on what you could do to improve company performance	.28	.41	.03	.02	-.17
18. Find out why you got the size of raise you did	.03	.14	.76	.04	.14

TABLE 1 (continued)

Items ^a	Factors ^b				
	Feedback	Planning	Recourse	Observation	Unnamed ^c
19. Make an appeal about the size of a raise	.12	-.03	.76	.02	.05
20. Express your feelings to your supervisor about salary decision	.19	.01	.69	.01	.02
21. Discuss, with your supervisor, how your performance was evaluated	.29	.21	.64	.15	.23
22. Develop, with your supervisor, an action plan for future performance	.35	.39	.54	.06	.01
23. Frequently observed your performance	.28	.33	.07	.89	-.03
24. Behaved in a way you thought was not appropriate (R)	.35	-.03	.08	-.02	.57
25. Allowed personal motives or biases to influence recommendation	-.04	.12	.11	.05	.52
26. Was influenced by things that should not have been considered (R)	.09	-.21	.15	-.04	.40
Unrotated eigenvalues	4.5	5.78	1.73	1.27	0.98
Variance explained	17.3	22.2	6.6	4.9	3.8
Cronbach's alpha	.89	.85	.88		

^a We introduced items 1-12, 15-17, and 23-26 with "Indicate the extent to which your supervisor did each of the following." All other items were introduced with "Indicate how much of an opportunity existed, AFTER THE LAST RAISE DECISION, for you to do each of the following things." "R" indicates reverse scoring.

^b Boldface indicates the items that were used to define each factor.

^c This factor was eliminated.

tween predictors and criteria, we included it as a control in examining the relationships between procedural or distributive justice and the criteria.¹

The percent of salary increase was included because Dipboye and de Pontbriand (1981) demonstrated that the perceived favorability of an appraisal was strongly and positively related to employees' opinions of an appraisal system. We could not control favorability of appraisals *per se* in this study because most employees did not receive a formal appraisal rating; hence, we used the raises awarded as a proxy. Because employees were aware of the company philosophy that pay was to be based on performance, we presumed that the higher an employee's raise, the higher the likelihood the employee would infer that the evaluation of his or her work had been favorable.

RESULTS

Table 2 shows the means, standard deviations, intercorrelations, and reliabilities for all variables. The multiitem scales' reliabilities were acceptable, exceeding the .70 value recommended by Nunnally (1978).

The top of Table 3 displays the results of the multiple regression analysis that included all the study variables, and the bottom of the table shows the results of testing our hypotheses with a usefulness analysis involving hierarchical multiple regression (Darlington, 1968). A usefulness analysis examines a predictor's contribution to unique variance in a criterion beyond another predictor's contribution.

The full regression analysis shows that feedback, a component of procedural justice, is significantly correlated with organizational commitment and with trust in supervisor. Recourse, another component of procedural justice, is also significantly related to trust in supervisor. The distributive justice index and feedback are significantly related to satisfaction with raises. The perceived favorability of a raise and its contingency on performance, however, were not significant predictors of employee attitudes. The usefulness analysis shows the components of procedural justice to be uniquely associated with all the criterion variables, whereas controlling procedural justice shows distributive justice to be uniquely associated only

¹ Brief, Burke, Atieh, Robinson, and Webster noted that "serious thought needs to be given to . . . how NA might interact with such context factors as an organization's goal setting, performance appraisal, and compensation systems" (1988: 197). In their research, Brief and colleagues examined the extent to which the relationship between self-reported stress as a predictor variable and self-reported strain as a criterion variable might be contaminated by negative affectivity as a nuisance variable. Their results "indicated zero-order stress-strain relationships as commonly reported in the literature, at best, are obscured by NA with the zero-order relationships being inflated considerably" (1988: 194). The effort to control for similar spurious and inflated relationships between predictors and criteria was the basis for our examining negative affectivity's role as a nuisance factor in our data.

TABLE 2
Means, Standard Deviations, Reliabilities, and Correlations^a

Scales	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Organizational commitment ^b	5.44	1.29	.92											
2. Satisfaction with raise ^c	2.84	0.98	.35***	.86										
3. Trust in supervisor ^d	6.30	2.25	.48***	.45***	.86									
4. Feedback ^{d,e}	5.62	1.73	.43***	.56***	.58***	.89								
5. Planning ^{d,e}	5.79	2.03	.39***	.37***	.53***	.67***	.85							
6. Recourse ^{d,e}	5.60	2.43	.22***	.38***	.40***	.50***	.45***	.88						
7. Observation ^{d,e}	6.03	2.74	.32***	.26***	.37***	.52***	.58***	.26***						
8. Global distributive justice ^{d,f}	4.46	2.47	.33***	.64***	.35***	.49***	.35***	.33***	.28***	.86				
9. Outcome expectation ^{d,f}	3.95	2.38	.23***	.54***	.27***	.36***	.32***	.33***	.26***	.71***				
10. Outcome contingency ^{d,f}	4.54	2.89	.33***	.57***	.32***	.44***	.46***	.35***	.35***	.74***	.69***			
11. Raise	4.54	3.07	.11	.33***	.15	.24***	.16	.18	.12	.42***	.34***	.38***		
12. Negative affectivity ^b	1.75	0.65	-.22***	-.12	-.26***	-.33***	-.03	-.10	-.11	-.11	-.11	-.05	-.06	.88

^a Coefficient alpha reliability estimates are shown on the diagonal; no estimates are given for one-item measures.

^b This was a 7-point scale.

^c This was a 5-point scale.

^d This was a 9-point scale.

^e This scale measured a component of procedural justice.

^f This scale was a measure of distributive justice.

*** $p < .001$

TABLE 3
Effects of Procedural and Distributive Justice^a

(a) Regression Analyses						
Independent Variables	Organizational Commitment		Satisfaction with Raise		Trust in Supervisor	
	<i>b</i>	β	<i>b</i>	β	<i>b</i>	β
Components of procedural justice						
Feedback	.23 (.13)	.29*	.16 (.08)	.23*	.66 (.19)	.47*
Planning	.01 (.10)	.01	-.02 (.06)	-.05	.21 (.14)	.20
Recourse	.01 (.05)	.03	.04 (.03)	.10	.17 (.08)	.18*
Observation	.02 (.05)	.05	.00 (.03)	.00	-.10 (.07)	-.12
Distributive justice						
Favorability of raise	-.08 (.08)	-.14	.05 (.05)	.12	-.06 (.11)	-.06
Raise related to performance	.07 (.06)	.15	.03 (.04)	.10	-.03 (.09)	-.04
Distributive justice index	.08 (.07)	.15	.11 (.05)	.28*	.07 (.11)	.07
Negative affectivity	-.29 (.19)	-.13	.20 (.12)	.13	-.13 (.28)	-.03
Raise	-.03 (.04)	-.08	.01 (.02)	.03	-.03 (.06)	-.04
R ²	.24**		.51**		.38**	
(b) Usefulness Analysis ^b						
Components of procedural justice beyond distributive justice						
	.109**		.086**		.250**	
Distributive justice beyond components of procedural justice						
	.022		.187**		.005	
Components of procedural justice and distributive justice						
	.49**		.71**		.62**	

^a Standard errors are in parentheses.

^b In the usefulness analysis, where the entry indicates x beyond y, it means the increment in the square of the multiple correlation coefficient when x is added following y. Otherwise, the entry is the multiple correlation coefficient.

* $p < .05$

** $p < .01$

with pay satisfaction. A structural equation analysis using the LISREL VI program (Jöreskog and Sörbom, 1984) confirmed these results.²

DISCUSSION

The question of whether attitudes toward an organization, its authorities, and the outcomes it provides show the same relationships with distrib-

² The results of the structural-equations modeling analysis using LISREL VI are available from the authors.

utive and procedural justice as have emerged in legal and political contexts guided this research. Clearly, the answer is yes. As Table 3 indicates, perceptions of distributive justice are uniquely associated only with satisfaction regarding an individual's own outcomes (i.e., pay satisfaction). On the other hand, only perceptions about the procedures used in determining pay raises make a unique contribution to organizational commitment and trust in supervisor.

Indeed, procedural justice also makes a significant contribution to pay satisfaction. Tyler, Rasinski, and McGraw (1985) also found that both procedural and distributive justice contributed significantly to variance in outcome satisfaction; nevertheless, as our introduction noted, the contribution of distributive justice in their study was nearly twice that of procedural justice. The results of our usefulness analysis show virtually the same ratio of contributions, supporting the general hypothesis that procedural justice makes relatively less of a contribution—not that it is incapable of making any unique contribution to outcome satisfaction at all. Thus, these results imply a strong overall impact of procedural justice.

Because our design was cross-sectional, the present data do not provide conclusive proof of the proposed causal order from perceptions about justice to the criterion variables. That is, the order could run from the latter variables to the former; for instance, level of commitment could influence responses concerning procedural justice. But although our data are cross-sectional, the methodologically stronger grounds of a longitudinal study (Tyler, 1987) have provided evidence for a causal order running from procedures to institutional-level evaluations in a legal context. Future studies should capitalize on opportunities for panel surveys in order to test this causal order in organizational settings.

Alternative interpretations of our data based on common method variance are also possible, although the differential impact of distributive and procedural justice on the criterion variables renders them somewhat implausible. For example, postulating a similar response bias across measures is inconsistent with distributive justice's having made a unique contribution to pay satisfaction but not to commitment and trust. Our use of negative affectivity as a control measure provided an additional form of protection against response-response bias.

Despite limitations, our findings are noteworthy in pointing to a remarkable consistency across three research domains—legal, political, and organizational.³ The generality of such results suggests that apart from their

³ There is also evidence for consistency across organizations. Data have been gathered from 37 employees at a different organization (Konovsky, Folger, & Cropanzano, 1987) in a preliminary attempt to verify the relationships investigated in the current study. Although the group was too small to warrant firm conclusions, the results were entirely consistent with the current results: the contribution of procedural justice beyond that of distributive justice was significant for trust and commitment but not for pay satisfaction, whereas the contribution of distributive justice beyond that of procedural justice was significant only in the case of pay satisfaction. These results help establish that our present results are not sample-specific.

desire for fair outcomes, people care a great deal about the justice of decision-making procedures. Moreover, as the issue moves from the level of personal satisfaction with present outcomes to higher-order issues regarding commitment to a system and trust in its authorities, these procedural concerns begin to loom larger than the distributive ones emphasized by equity theory.

If these concerns are indeed so important, why have procedural justice issues been so long neglected? One reason may be that procedures are often regarded simply as means to an end. According to this instrumental perspective, procedures should be evaluated according to their capacity for effecting fair outcomes, which implies that procedural justice means very little because it refers only to actions designed to yield distributive justice. Such an outcome-driven perspective, however, cannot account for the unique contribution made by procedural justice to certain criteria when distributive justice ratings were statistically controlled. These findings emerged from our data on organizational commitment and trust in supervisor; hence, they raise the following question: What other aspects of procedures exist that can, when stripped of their relationship to distributive justice ratings, retain an association with attitudes toward institutions and their authorities?

One answer is that procedures have both instrumental and non-instrumental aspects. Instrumentally, procedures are means to the ends of distributive justice, as when procedures used for allocation decisions about raises include ways of accurately measuring performance. Because controlling for perceived distributive justice eliminates this aspect, what remains is the noninstrumental aspect of procedures as ends in themselves (cf. Tyler & Caine, 1981; Tyler, Rasinski, & Spodick, 1985). To call procedures ends in themselves simply means that in addition to being the means for obtaining tangible outcomes like raises, they also provide intangible or symbolic outcomes, such as respect. Fair procedures can indicate that an appraiser respects the dignity of an appraisee sufficiently to make decisions in a particular manner—one that philosophers of justice (Dworkin, 1977; Rawls, 1971) see as conveying regard for people's dignity and self-respect. Such procedural actions treat human beings as ends rather than means and treat them as entitled to respect and concern that are symbolic outcomes of how a decision-making process is implemented, regardless of what tangible outcomes are provided.

Our procedural justice factors are interpretable as indicating employees' interest in such forms of respect. Factor 1, feedback, for instance, contains items stressing groundedness in evidence (e.g. familiarity with performance) as well as items stressing the candor, consistency, and ethicality of the feedback given by a supervisor; all these items show various forms of respect. Other items on the same factor are aspects of two-way communication: employees' having an opportunity to express their side and supervisors' allowing employees' input before making a recommendation and considering their views. These aspects of two-way communication evidence respect in the form of regard for an employee's opinions.

Rawls observed that "among other things, respect for persons is shown by treating them in ways that they can see to be justified" (1971: 586). Similarly, Bies suggested that people experience moral outrage when an explanation for a decision is not provided or is inadequate (for supporting evidence, see Folger, Rosenfield, and Robinson, 1983). Items on this study's recourse factor, including opportunities to find out why a raise was the size it was, to discuss how performance was evaluated, and to make an appeal, fall into this category.

Finally, respect is also shown by informing people of performance appraisal criteria in advance rather than using unexpected criteria. A review of objectives for improvement and standards for future evaluations similar to the items on the planning factor would ensure that employees have received adequate notice of performance criteria. Indeed, the concept of adequate notice is crucial to procedural due process in legal contexts (Forkosch, 1958).

Thus, noninstrumental procedural justice can be interpreted in terms of features—actions taken and opportunities provided by a decision maker—that convey respect for employees' rights and imply that employees are ends rather than means. We now consider why a collateral, pure strain of distributive justice, reflecting the perceived fairness of outcomes regardless of how the pay raises were decided, made no unique contribution to trust and commitment.

When the responses associated with how a decision was made are statistically removed, the residual measure of perceived distributive justice constitutes attention paid to strictly quid pro quo matters concerning fairness in the exchange of labor for compensation. Employees have already paid for their compensation by providing labor, so an organization is showing employees no additional respect beyond what they have already earned. Theoretically, any appraiser examining the same information about an employee's performance contribution should make the same allocation, meaning that there is no basis for attributing any unique qualities to the person responsible for the allocation decision (cf. Jones & Davis, 1965). Such attributional circumstances also imply that the organization has not done anything to distinguish itself from any other organization, because all organizations are expected to provide "a fair day's pay for a fair day's work," so employees have no reason to feel commitment toward the particular organization for which they are working.

Kerr and Slocum argued that organizational commitment is stifled by a culture that tightly specifies obligations and overemphasizes the contractual fairness of exchange: "Neither party recognizes the right of the other to demand more than was originally specified" (1987: 103). Rather than treating people as ends, those authors continue, "the contract . . . is utilitarian, since each party uses the other as a means of furthering its own goals" (1987: 103). This utilitarian and contractual approach contrasts sharply with the philosophy of companies where "everyone recognizes an obligation that goes beyond the simple exchange of labor for salary"; in the latter, "commitment to the organization (loyalty) is exchanged for the organization's

long-term commitment to the individual (security)" (Kerr & Slocum, 1981: 101). Paradoxically, designing appraisal instruments in the interests of distributive justice—so that the element of judgment is minimized and allocation decisions can be made on the basis of strict input-outcome formulas—may vitiate a sense of procedural justice essential to establishing grounds for trust and commitment.

The implications of attending to procedural justice rather than distributive justice alone are likely to be far-reaching. Our results imply that to be maximally effective in sustaining employee commitment to an organization and trust in its management, those making allocative decisions—and other organizational decisions generally—must take procedural justice into account. Furthermore, recent research by Tyler (forthcoming) has shown that procedural justice has a significant impact on compliance with law. Our study's evidence of generalizability from legal to organizational settings is thus only the first step in what should become a sustained research effort to include behavioral measures like compliance as well as measures implied by our analysis of noncontractual obligations like organizational citizenship behaviors. Related evidence has demonstrated that an index of "organizational experiences" was strongly associated with intention to leave (Lee & Mowday, 1987), and in our opinion approximately half the items on that index were procedural in nature.

It is clear that the procedures used to make decisions about rewards have substantial impact. Kerr and Slocum noted, "The reward system . . . is an unequivocal statement of the organization's values and beliefs" (1987: 99). We would add that a key aspect of reward systems involves not only the *what* of rewards that equity theory has emphasized, but also the *how* emphasized by work on procedural justice. Our results lend credence to Lind and Tyler's conclusion that "the great practical value of procedural justice lies in its capacity to enhance . . . positive evaluations of the organization. . . . Fair procedure may be one of the crucial elements of organizational viability" (1988: 191).

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Robert Folger is a professor of organizational behavior at the A. B. Freeman School of Business of Tulane University. He received his Ph.D. degree from the University of North Carolina in 1975. His research interests are procedural justice in organizations, performance appraisal, and motivation.

Mary Konovsky is an assistant professor of organizational behavior at the A. B. Freeman School of Business of Tulane University. She received her Ph.D. degree from the Indiana University School of Business in 1986. Her research interests focus on procedural justice in organizations, organizational citizenship behavior, and characteristics of service organizations.

EFFECTS OF ENVIRONMENTAL SCARCITY AND MUNIFICENCE ON THE RELATIONSHIP OF CONTEXT TO ORGANIZATIONAL STRUCTURE

MASOUD YASAI-ARDEKANI
University of Wisconsin-Milwaukee

This study compared the relationships between context and organizational structures under conditions of environmental scarcity and conditions of environmental munificence. The study analyzed data on a sample of 45 firms in the electrical and electronics industry in England. Results show that relationships between perceived environmental pressures and structure and between inflexibility of technology and structure are different under conditions of scarcity and munificence. Results further reveal that the relationships between size and structure do not differ under scarcity and munificence.

The literature on the effects of decline and scarcity has grown rapidly over the past decade. Researchers have examined a variety of organizational responses to conditions of decline and scarcity in both public-sector and private-sector organizations. At the macro level, research has focused on strategic responses (Cameron, 1984; Cameron & Zammuto, 1983; Chaffee, 1984; Harrigan, 1980; Schendel, Patton, & Riggs, 1976) and on structural responses (Cameron, 1983; Cameron, Whetten, & Kim, 1987; Cullen, Anderson, & Baker, 1986; Freeman & Hannan, 1975; Ford, 1980a; Levin, 1978; Levin, Rubin, & Wolohojian, 1982; Rubin, 1977).

Studies of structural responses have employed a variety of research methodologies: experiments, case analyses, field observations, and large-sample studies. Although most of those studies have examined the consequences of decline and scarcity, a few (Cameron et al., 1987; Zammuto, 1983) have contrasted structural responses to conditions of scarcity with responses to conditions of munificence.

Despite the voluminous literature on the effects of decline on organizational structure, relatively few studies have examined how decline and scarcity affect the relationships between the context and structure of organizations. Even fewer studies have compared context-structure relationships under conditions of munificence and scarcity. Previous research has examined the effects of munificence and scarcity on the relationships between power

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and resource allocation in universities (Hills & Mahoney, 1978; Pfeffer & Moore, 1980), between size and administrative intensity in school districts and universities (Cullen et al., 1986; Ford, 1980a; Freeman & Hannan, 1975), and between technology and administrative intensity in manufacturing organizations (McKinley, 1987). Most of these studies, however, have focused on educational establishments and have considered a small number of contextual variables.

The purpose of this study was to extend this line of research by examining the effects of environmental munificence and scarcity on the relationship between context and structure. This study focused on manufacturing organizations and considered a wider range of context and structural variables than the previous research. I broadly defined organizational context to include both organizational and environmental dimensions. Context variables considered included organizational size, inflexibility of technology, and perceived environmental pressures. The relationships between those context variables and three structural attributes, complexity, formalization, and centralization, were examined. The approach to analysis undertaken in this study allowed examination of the effects of individual context variables on structural characteristics in the presence of other context variables. This approach further contrasts with the approach of most prior studies, which have examined the effects of individual context variables on structure in isolation.

THEORY AND HYPOTHESES

Environments and Organizational Structure

Studies of relationships between environment and structure have typically focused on the effects of environmental uncertainty on the structures of organizations. Hypotheses have linked greater environmental uncertainty to higher levels of structural complexity, lower formality, and greater decentralization of decision making (Downey, Hellriegel, & Slocum, 1975; Duncan, 1972; Lawrence & Lorsch, 1967). Although such hypothesized relationships may truly reflect organizational responses to perceived environmental uncertainty in munificent conditions, different responses may be expected in conditions of scarcity. Case studies of organizations facing environmental scarcity suggest that the restriction of channels of communication, formalization of procedures, and centralization of decision making typify organizational responses to environmental scarcity (Cameron & Zammuto, 1983; Levin, 1978; Levin et al., 1982; Zammuto, 1983).

Such a pattern of structural responses to environmental scarcity parallels descriptions of organizational responses to crises and environmentally induced threats (Staw, Sandelands, & Dutton, 1981). Researchers have suggested that organizational responses to crises include a tendency to increase the formalization of procedures and standardization. Problem solving becomes more rigid than it had been previously, and adherence to previously established decision rules is emphasized. Furthermore, there is a tendency

toward greater centralization of decision making. Not only does the locus of decision making shift to higher hierarchical levels in times of crisis, but fewer people are involved in the decision-making process (Billings, Milburn, & Schaalman, 1980; Hedberg, Nystrom, & Starbuck, 1976; Holsti, 1971; Smart & Vertinsky, 1977). Research on environmental hostility (Khandwalla, 1972), environmental turbulence (Bourgeois, McAllister, & Mitchell, 1978), and financial adversity (Hall & Mansfield, 1971) has also suggested structural responses similar to those induced by crises.

Staw and his colleagues (1981) argued that the major force behind such structural responses is the perceived threat to organizational survival. Their threat-rigidity model predicts that organizations facing threatening environments undergo a structural change that resembles a mechanistic shift, or increased formalization, standardization, and centralization. Since environmental scarcity threatens the continued viability of organizations inhabiting such environments, the threat-rigidity model may well explain structural responses to environmental scarcity.

Although theoretical models of organizational responses to crises, threat, and scarcity have emphasized the importance of perceptions in the process of adaptation (Billings et al., 1980; Cameron & Zammuto, 1983; Levin, 1978; Jick & Murray, 1982; Whetten, 1980), most studies of organizations facing environmental scarcity have posited direct linkages between environment, defined as decline in resources or as decline in the size of a market, and organizational responses.

Managers' perceptions of environmental conditions play a key role in the process of structural adaptation. As Weick (1969) argued, organizations come to know their environments only via managers' perceptions. Similarly, Miles, Snow, and Pfeffer (1974) suggested that organizations respond to what they perceive and that unnoticed events do not affect organizations' decisions and actions. Consequently, managers' perceptions of environmental conditions lie at the heart of structural adaptations to environments.

This study's hypotheses link managers' perceptions of environmental pressures to organizational structures under the two conditions of environmental munificence and environmental scarcity. Environmental munificence and scarcity refer to the objective condition of an environment and were measured with objective industry-demand data. For conditions of both munificence and scarcity, the hypotheses focused on how organizations adapt their structures in response to perceived environmental pressures—constraints and competition—in their environments. Perceived constraints resulting from interactions with other organizations (financial institutions, trade unions, buyers, governments, etc.) in an environment as well as perceived competitive pressures, in prices, promotion, product quality and variety, in organizations' markets were the focal points of study. Albeit such constraints and competitive pressures exist under conditions of both munificence and scarcity, they have different, perhaps opposite, implications for organizations' continued viability and thus may result in different structural responses. The focus on perceived constraints and competitive pressures in

this study is in contrast to the focus of the majority of organization-environment studies, which have relied on the concept of environmental uncertainty. Measures of constraints and competitive pressures tap real forces that have an impact on managers' decisions and actions (Yasai-Ardekani, 1986).

High levels of perceived constraints and competitive pressures in an environment generate a need for timely organizational responses. In munificent environments, there will be a tendency to delegate decision-making authority to lower organizational units that more closely interface with an organization's environment. Such delegation enables employees to make timely responses that remove constraints or that deal more effectively with competitive pressures. Furthermore, organizations will tend to deploy a large number of specialists to whom such decisions are delegated. There will also be a tendency toward lower formalization of procedures to allow greater flexibility in dealing with perceived environmental pressures. In munificent environments, the costs of errors associated with relatively loose control of operations seem negligible compared to the benefits of opportunities created through rapid removal of constraints and timely responses to competitive pressures.

On the other hand, under conditions of environmental scarcity, perceptions of high levels of constraints and competitive pressures may precipitate a crisis-like situation. Losses associated with faulty decisions may be highly damaging to organizations' continued viability. Thus, top management will become more involved in decision-making by establishing shorter lines of communication and exercising more direct control, especially regarding strategic decisions. Although no one has documented direct effects of perceived environmental pressures, studies of business firms have reported greater centralization of decision making in response to financial adversity and crises (Dunbar & Goldberg, 1978; Starbuck, Greve, & Hedberg, 1978), and studies of educational establishments facing declining enrollments (Cameron et al., 1987) and of public-sector organizations confronted with resource scarcity (Levin, 1978; Levin et al., 1982) have also reported increases in the centralization of decision making. When top management seeks to tighten control of operations, it may also institute a greater formalization of procedures. Studies of universities have reported observing an increase in the formalization of procedures in conditions of decline (Cameron, 1983; Rubin, 1977). Greater emphasis on formalized procedures coupled with greater centralization gives management a sense of control over organizational activities. Furthermore, greater formalization may be designed to achieve greater efficiencies in operations.

Moreover, although need for greater efficiencies may adversely affect employment levels, the level of structural complexity in an organization, as reflected by the functional specialization and professional qualifications, may not be affected. Under conditions of scarcity, organizations may cut back employment levels in each area of specialization, but elimination of entire functions is less likely to occur. Similarly, although cutbacks in the

number of professionally qualified staff members are likely, the number of areas in which professionals are deployed is less likely to be affected.

These response patterns parallel both theoretical developments on organizational responses to crises (Billings et al., 1980) and descriptions of organizational responses to environmentally induced threats and crises (Billings et al., 1980; Khandwalla, 1972; Nystrom & Starbuck, 1984). The foregoing arguments clearly suggest that organizational responses to environments are dissimilar under conditions of environmental scarcity and munificence. More specifically, Hypotheses 1–3 are advanced concerning the effects of environmental pressures—perceived constraints and competition—on structural attributes of complexity, formalization, and centralization under conditions of environmental scarcity and munificence.

Hypothesis 1: Structural complexity, as reflected by functional specialization and professional qualifications, is positively related to perceived environmental pressures under conditions of environmental munificence but unrelated to perceived environmental pressures under conditions of environmental scarcity.

Hypothesis 2: Formalization is negatively related to perceived environmental pressures under conditions of environmental munificence but positively related to perceived environmental pressures under conditions of environmental scarcity.

Hypothesis 3: Centralization of both operating and strategic decisions is negatively related to perceived environmental pressures under conditions of environmental munificence but positively related to perceived environmental pressures under conditions of environmental scarcity.

Technology and Organizational Structure

Although past research has distinguished between the effects of scarcity and munificence on environment-structure relationships, the stream of research available on the effects of technology on structures has not made such a distinction. Most studies of relationships between technology and structure have assumed a uniform structural response to the technological imperative. However, Blau, Falbe, McKinley, and Tracy (1976) identified nonlinear relationships between technology and some dimensions of organizational structures. Furthermore, a few studies have suggested that environmental change and diversity (Freeman, 1973) or the growth and decline of organizational size (McKinley, 1987) may moderate technology-structure relationships. Two comprehensive reviews of technology studies that have appeared in recent years (Fry, 1982; Gerwin, 1981) bear testimony to the paucity of empirical studies that examine the influences of environmental conditions on technology-structure relationships.

At the organizational level, operations technology has been the focal

point of analysis. Gerwin (1981) made a conceptual distinction between two attributes of technology: variety, the existence of different task-technology combinations, and explicitness, the degree to which a well-defined task-technology combination exists.

Explicitness of technology has been widely researched. Although researchers have used different labels, such as technological complexity (Woodward, 1965), production continuity (Child & Mansfield, 1972), workflow integration (Hickson, Pugh, & Pheysey, 1969), mechanization (Blau et al., 1976), and automaticity (Inkson, Pugh, & Hickson, 1970), measures of operations technology tap the dimension of explicitness. These measures, albeit using different scaling procedures, focus on the degree to which automated, continuous, fixed-sequenced activities are present in a conversion process, and thus represent technological explicitness.

Researchers have hypothesized that the explicitness of operations technology is positively related to structural complexity and formalization and negatively related to the centralization of decision making (Gerwin, 1981). Numerous studies have tested the hypothesized relationships but have provided little support for effects of technology. Gerwin's (1981) meta-analysis of a number of these studies (Blau et al., 1976; Child & Mansfield, 1972; Hickson et al., 1969; Hinings & Lee, 1971; Khandwalla, 1974; Tracy & Azumi, 1976) showed that technological inflexibility had no effect on organizational structures when the effects of organizational size were statistically removed from the analysis.

The hypotheses on the effects of technology that scholars have advanced are founded on the premise that explicit technologies allow greater regulation of a work-flow and thus lend themselves to more bureaucratic modes of control, including the use of specialists, formalized procedures, and decentralization. Also, the greater technical sophistication of the more explicit technologies requires more elaborate administrative structures involving the deployment of a greater number of professionally qualified specialists. Furthermore, such structures evolve in organizations with more inflexible, rigid technologies because such organizations have a greater need to protect their core technologies from environmental perturbations than do organizations with relatively flexible technologies (Thompson, 1967).

Explicit technologies increase organizational vulnerability to environmental perturbations. Such technologies often involve highly automated, specialized equipment that limits the range and variety of output, and thus they are highly vulnerable to downturns in demand. Explicit technologies are less adaptable to changing market conditions than are other technologies and are also severely constrained by disruptions in supplies of critical inputs. Furthermore, the high level of capital investment associated with automated technologies substantially increases the costs of operating below capacity and thus further exacerbates organizational vulnerability to environmentally induced disruptions.

Since explicitness of a core technology increases organizational vulnerability to both internally and externally induced disruptions, explicitness

increases the need for protection of the core technology from such disruptions. Organizations with more explicit technologies are thus expected to expend more effort to protect their core technologies from environmental perturbations than do organizations with relatively flexible technologies, thereby realizing the efficiencies of their explicit technologies.

Organizations, however, do not respond similarly under all conditions to demands imposed by the characteristics of their technologies. The effects of technology on structure may depend on the nature of an organization's environment. Although an organization's degree of technological inflexibility influences the need to protect its core technology, the degree of environmental munificence or scarcity also affects such needs. Environmental munificence lessens the need to protect a core technology, but conditions of scarcity amplify such needs.

In conditions of environmental scarcity, organizations with inflexible technologies are the most vulnerable because of limits on the range and variety of output and the high costs of operating below capacity. A substantial level of investment in inflexible manufacturing processes, which deters exit from an industry despite conditions of scarcity (Harrigan, 1981; Porter, 1980) exacerbates such vulnerability. Organizations with flexible technologies are less vulnerable to conditions of scarcity because of the greater adaptability of the core technology, lower costs of operating below capacity, and greater ease with which competitors may exit under conditions of scarcity.

In conditions of environmental scarcity, therefore, the need to protect the core technology becomes pervasive in organizations with inflexible, rigid technologies because of their greater vulnerability. Organizations with more inflexible technologies are likely to adopt structures involving greater specialization, centralization, and formalization of procedures. Deployment of a larger number of specialized, professionally qualified staff may enhance environmental surveillance and systematic searching for new market opportunities. Furthermore, greater use of formalized procedures and centralization of decisions may enhance tighter control of costs. Moreover, in addition to structural manifestations, due to greater vulnerability of organizations with more inflexible technologies, the indivisibility of the manufacturing processes associated with an inflexible technology may necessitate maintenance of structural complexity. In contrast, organizations with flexible technologies may be able to scale down operations readily and adjust structural complexity accordingly. Consequently, in conditions of environmental scarcity, inflexibility of technology will be expected to affect organizational structures significantly.

Environmental munificence, on the other hand, dampens the need for protection of a core technology. Where demand may run ahead of capacity, all organizations, regardless of the characteristics of their core technologies, will seek to satisfy that demand. They will increase output levels to take fullest advantage of opportunities created by the munificence of their environments. Under such conditions, there may be little felt need to protect a core technology from the environment. Differences in structural character-

istics may reflect differences in the scale of operations rather than the character of an organization's core technology. Consequently, in munificent environments, the effects of inflexibility of technology on organizational structures may be negligible.

The hypotheses advanced by previous researchers may thus reflect the effects of technology on organizational structure only under conditions of scarcity. Greater functional specialization, deployment of professionally qualified staff in a greater number of areas, and greater formalization of procedures may be associated with technological inflexibility only under conditions of environmental scarcity. Furthermore, although some operating decisions may be delegated to lower organizational levels because of technological complexities, senior executives are more likely to make strategic decisions in organizations with more inflexible technologies—particularly under conditions of environmental scarcity—because of the organizations' greater vulnerability.

The foregoing discussion on the moderating role of environmental munificence and scarcity suggests that technological inflexibility affects organizational structures only under conditions of environmental scarcity. Under conditions of environmental munificence, the effects of technological inflexibility may be negligible, which would be consistent with earlier studies' findings.

The foregoing suggests asymmetrical relationships between inflexibility of technology and organizational structures under conditions of environmental scarcity and munificence.

Hypothesis 4: Structural complexity, as reflected by functional specialization and professional qualifications, is unrelated to inflexibility of technology under conditions of environmental munificence but positively related to inflexibility of technology under conditions of environmental scarcity.

Hypothesis 5: Formalization is unrelated to inflexibility of technology under conditions of environmental munificence but positively related to inflexibility of technology under conditions of environmental scarcity.

Hypothesis 6: Centralization of both operating and strategic decisions is unrelated to inflexibility of technology under conditions of environmental munificence but positively related to inflexibility of technology under conditions of environmental scarcity.

Size and Organizational Structure

The number of empirical studies of size and structure has increased dramatically in the recent past. Yet, according to Kimberly (1976), most of those studies have searched for empirical regularities at the expense of developing consistent theoretical bases. With a few exceptions (Cullen et al.,

1986; Ford, 1980a; Freeman & Hannan, 1975; McKinley, 1987), most studies have assumed that the effects of size on structure are similar under all conditions.

A majority of studies have used number of employees as an operational measure of size. Furthermore, in examining relationships between size and structural characteristics, they have used logarithms of size in correlation and regression analyses. Kimberly (1976) argued that despite the widespread use of logarithms of size, very few studies have addressed the theoretical implications of their empirically guided results. The usual reasoning is that a logarithmic size measure provides a better empirical fit between size and structural variables. What is often ignored is that the better linear fit resulting from the use of the transformation clearly indicates that the relationships between size and structure are not uniformly linear for all sizes. These logarithmic relationships suggest that structural variations are more sensitive to variations in size among small organizations than among large ones (Kimberly, 1976). Furthermore, the logarithmic shape of the curves depicting the size-structure relationships suggests the existence of a threshold beyond which changes in size will have insignificant effects on structural characteristics. Child's (1973) graphical comparison of relationships between size and structure using data from his own study as well as from the Aston study (Pugh et al., 1969) and from Blau and Schoenherr (1971) showed that the threshold was about 1,000 employees.

Freeman and Hannan (1975) were among the first to propose and empirically test for the moderating effects of environments on size-structure relationships. Using a sample of 805 school districts, they showed that the number of administrators increased in response to increased numbers of teachers for districts that experienced growth in enrollment; however, administrators decreased more slowly for districts that experienced decline in enrollment than they had increased in the growing districts. A longitudinal analysis of 24 school districts (Ford, 1980a) showed that growing districts added administrators in response to increased enrollment but that most declining districts also added administrators. When administrators were removed in some declining districts, the rate of removal was slower than the rate at which they were added in growing districts. A more recent intraorganization analysis of the direct effects of size, measured in terms of full-time faculty, on the administrative component in 134 universities showed that most declining universities increased the number of administrators in response to a decrease in full-time faculty (Cullen et al., 1986). These studies' findings imply that, for a given size level, declining organizations will have higher numbers of administrators than will growing organizations. Empirical evidence on relations between size and structure in growing and declining organizations is, however, limited to studies of the administrative component, except for Cullen and colleagues' (1986) study, which also included levels of differentiation. Ford (1980b) suggested, however, that levels of structure (complexity, formalization, and centralization) associated with a given level of size would be higher in declining organizations than in grow-

ing organizations. He further suggested that the rate of change in structure would be different during growth and decline of organizational size. Since organizations tend to grow in munificence and to contract in scarcity, the pattern of relationships between size and structure hypothesized by Ford (1980b) may be observable when contrasting conditions of environmental munificence and scarcity.

The logarithmic relationship between size and structural characteristics as well as the observation of a threshold, however, suggest that relationships between size and structure are not uniformly linear for all sizes. For organizations below the threshold size value, changes in size may result in significant changes in structural characteristics. But for organizations above the threshold, the effects of changes in size on structure may be negligible. The moderating effects of environmental scarcity on the relationships between size and structure may therefore be limited to small organizations. Thus, the hypotheses Ford (1980b) advanced may have restricted validity. This line of reasoning leads to the following testable hypotheses on relationships between size and structure in conditions of environmental munificence and scarcity.

Hypothesis 7a: Structural complexity, as reflected by functional specialization and professional qualifications, formalization, and decentralization are positively related to organizational size under conditions of both environmental munificence and scarcity.

Hypothesis 7b: The slopes of relationships between size and structural characteristics are different under conditions of environmental munificence and scarcity in small organizations but do not differ for large organizations.

METHODS

Sample

The sample frame was provided by 502 electrical engineering companies in southeastern England listed in the *Report on the Census of Production, 1968, Directory of Business for Electrical Engineering Industry*. From this directory, 150 companies were randomly selected. The chief executives of each company were contacted by telephone, and 45 agreed to participate in the study, resulting in a response rate of 30 percent. In terms of Standard Industrial Classification (SIC) codes, the 45 companies were distributed among the eight sectors of the electrical engineering industry as follows: 11 in the electrical and electronic component sector (SIC-364), 1 in telecommunications (SIC-363), 4 in domestic electrical appliances (SIC-368), 4 in broadcast and sound reproducing (SIC-365), 6 in electrical machinery (SIC-361), 10 in electronic capital goods (SIC-367), 8 in miscellaneous electricals (SIC-369), and 1 in computers (SIC-366). Grinyer and Yasai-Ardekani (1980) gives the distribution of the sample within each industrial classification in

terms of company size. Data were collected through structured interviews with each firm's chief executive officer (CEO) or other senior executives named by the CEOs. Interviews lasted between two and eight hours with a mean of three hours. I conducted all interviews between July 1975 and March 1976.

Measurements

Structure. Three attributes of organizational structure were measured: complexity, formalization, and centralization. Measures of structural complexity included the level of functional specialization and the professional qualifications of the officeholders. The functional specialization measure was a variant of the measure developed by Pugh, Hickson, Hinings, and Turner (1968). This measure is constructed through summing 31 specialization items, each indicating the existence or absence of at least one full-time individual exclusively charged with a particular specialized activity ($\alpha = .90$). The scale for professional qualifications gave the number of non-work-flow functions in which at least one specialist held a recognized professional qualification. Child (1973) developed this measure ($\alpha = .81$). I measured formalization of procedures using the abbreviated scale of formalization developed by Inkson and colleagues (1970), adopting the same scoring procedure they used ($\alpha = .88$).

The extent of the centralization of decision making was measured with a subset of decision items originally developed by Pugh and colleagues (1968) to measure centralization and subsequently used by Inkson and co-authors (1970) to represent organizational autonomy. Each decision item is scored on a 5-point scale indicating, in an ascending order, the hierarchical level at which the decision is made. Factor analysis of 20 decision items yielded separate clusters of decisions relating to the centralization of operating decisions and the centralization of strategic marketing and financial decisions. I developed two separate scales. The scale for centralization of operating decisions used 14 decision items ($\alpha = .89$), and the scale for centralization of strategic decisions used 6 items ($\alpha = .81$). Fuller details of the results of a factor analysis of these items appear in Grinyer and Yasai-Ardekani (1980).

Context. Measures of organizational context used in this study included size, technology, and perceived environmental pressures. Size was measured as the logarithm of the number of employees in a firm. Following Pugh and colleagues (1969), I used the degree of automation of the bulk of the equipment a firm used in operations to represent operations technology. The scale, called automaticity mode, is a subscale of the operations technology measure developed by Pugh and colleagues (1969). It measures operations technology on a 6-point scale ranging from use of hand tools and manual machines (0) to use of computer-controlled cognitive machines (5). The scale correlated strongly with other subscales measuring technology and had a loading of .87 on the factor representing the work-flow integration measure of operations technology (Hickson et al., 1969: 383). Automaticity mode also correlated strongly with measures of work-flow rigidity ($r = .59$) and work-

flow integration ($r = .81$) in Child and Mansfield's (1972) study of operations technology. Highly automated production processes, particularly if equipped with special purpose machinery, reflect relatively inflexible operations technologies.

A composite measure of perceived environmental pressures was developed through principal component analysis of ten 5-point scales. Three scales addressed the extent of perceived competition in the organizations' environments. Managers were asked to indicate the extent of competition in prices, promotion, and product quality. Seven scales addressed the extent of perceived constraints. Managers were asked to indicate the extent to which financial institutions, local governments, central governments, international bodies, buyers, suppliers, and trade unions constrained their organizations' activities. The extent of perceived competition and perceived constraints were scored using 5-point scales ranging from 1, very little, to 5, very great. I used principal components analysis for data reduction and development of a single measure representing the extent of perceived constraints and competitive pressures. That analysis produced a first component with an eigenvalue of 2.74; the scales, in the order in which they were discussed above, had loadings of .39, .28, .27, .53, .59, .71, .68, .67, .56, and .35 on the first principal component. Since the loadings on the first principal component were all positive, the corresponding principal component scores give a weighted average of the raw scores (Jolliffe, 1986: 48). Hence, the first principal component scores represent an overall measure of perceived environmental pressure. The pattern of loadings indicated that constraint items, with an average loading of .58, more strongly define the overall measure than do competition items (average loading = .31).

Environmental munificence and scarcity. The rate of change of demand for the industries' products and services was used to represent the extent of environmental munificence or scarcity. For each of the eight industry sectors, I measured growth of sales over 1973–77 using published industry sales data in constant prices. Four industries, electrical machinery, capital goods, miscellaneous products, and computers, experienced an increase in sales of between 4.2 and 34.6 percent over the period, and the 25 companies that belonged to those industries operated in conditions of environmental munificence. The other four industries (electrical components, broadcasting, domestic appliances, and telecommunications) experienced a decline in sales of between 2.5 and 39.6 percent over the 1973–77 period, and the 20 companies that belonged to these industries operated in conditions of environmental scarcity. Table 1 shows the means, standard deviations, and intercorrelations among the variables used in the study.

Statistical methods. In order to test the effects of environmental scarcity versus the effects of environmental munificence on the relationships between context and structure, I used multiple regression analysis with dummy variables. This approach was preferable to the use of separate regression analyses for the two conditions of munificence and scarcity because it allowed more degrees of freedom and hence greater precision in the re-

TABLE 1
Means, Standard Deviations, and Intercorrelations for All Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8
1. Functional specialization	14.16	7.72								
2. Professional qualifications	4.64	2.35	.72							
3. Formalization of procedures	11.69	4.86	.68	.79						
4. Centralization of operating decisions	38.56	6.98	-.73	-.57	-.52					
5. Centralization of strategic decisions	21.56	3.03	-.21	-.19	-.07	.50				
6. Organizational size ^b	2.61	0.59	.88	.71	.68	-.68	-.22			
7. Inflexibility of technology	1.33	1.19	.20	.19	.19	-.05	.10	.06		
8. Environmental pressures	0.00	1.00	.24	.31	.32	-.20	.10	.17	-.09	
9. Environmental condition ^c	0.42	0.50	.05	-.02	.05	-.23	-.20	.03	.09	-.03

^a All correlations above 0.30 are significant at $p < .05$ and all correlations above 0.39 are significant at $p < .01$. The number of observations varies between 42 and 45 because some data are missing.

^b Size was measured as the logarithm of the number of employees in each firm.

^c Condition was a dummy variable with 0 = munificence and 1 = scarcity.

gression estimates (Neter, Wasserman, & Kutner, 1985: 335). I regressed each structural variable on the context variables (size, inflexibility of technology, and perceived environmental pressures), on a dummy variable indicating the environmental conditions (0 = munificence, 1 = scarcity), and on cross-products of the context variables and the dummy variable. All three context variables were included in each regression equation so that the effects of each on structural characteristics could be examined in the presence of the others. In each equation, the coefficients of the context variables measured the effects of context on structure under conditions of munificence, and the coefficients of the cross-product terms gave the difference between the effects of context on structure under the two conditions, environmental munificence and environmental scarcity. Thus, I computed the effects of context on structure under conditions of scarcity as the sum of the coefficients of the context and the respective cross-product terms in the regression equations (Neter et al., 1985: 335). I directly tested the significance of the effects of context on structure under conditions of munificence and the significance of the difference between the effects of context on structure under the two conditions using the t -ratios of the respective regression coefficients. The

significance of the effects of context on structure under conditions of scarcity was tested using *t*-ratios formed by the computed coefficients over the respective standard errors. The standard error for each computed coefficient was obtained by the square root of the sum of variances and twice the covariance of the two regression coefficients, the coefficient of the context and respective cross-product terms in the regression equation (Kmenta, 1986: 420).

RESULTS

Table 2 shows the estimated models. The values of *F* for the first four models are highly significant, and the *R*²s are also very high. The model for centralization of strategic decisions shows a nonsignificant *F*¹ and an *R*² of 27 percent. The first three rows of Table 2 show the effects of the three context variables, organizational size, inflexibility of technology, and perceived environmental pressures, on structural characteristics under the condition of environmental munificence. The coefficients for the cross-product terms (rows 5–7) indicate the differences between the effects of the individual context variables on structural characteristics under the two conditions. The effects of the context variables on structural characteristics under environmental scarcity were computed as the sum of the coefficient of the context variables and the respective cross-product terms, as described in the statistical methods section. For ease of illustration and comparison, Table 3 shows the coefficients of the context variables for the condition of environmental munificence, the computed coefficients for the condition of environmental scarcity, and the difference coefficients.

Table 3 has five sections, each relating to a structural variable. For each structural variable, the entries in the first row show the effects of the context variables under the condition of environmental munificence. The entries in the second row show the effects of context variables under environmental scarcity, and the third row of entries shows the differences between the effects of the individual context variables under the two conditions.

Each of the hypotheses presented in the preceding sections contains two statements about the relationships between context and structure, one relating to munificence and one relating to scarcity. I considered a hypothesis to be supported when the coefficients under the two conditions were as stated and the test of their difference is in accord with the hypothesized relationship.

As can be seen from Table 3, the measure of perceived environmental

¹ Since the overall value for *F* of the regression equation for the centralization of strategic decisions was not significant, I refitted the model, excluding size and inflexibility of technology and their corresponding cross-product terms. The coefficient for the cross-product term between perceived environmental pressures and the dummy variable remained significant at the 5 percent level, and the refitted model had an *F* of 2.07, which was significant at the 10 percent level.

TABLE 2
Results of Multiple Regression Analysis of Structural Characteristics on Contextual Variables^a

Variables	Structural Characteristics				Centralization of Strategic Decisions
	Functional Specialization	Professional Qualifications	Formalization of Procedures	Centralization of Operating Decisions	
Context					
Organizational size ^b	12.172** (1.390)	2.713** (.594)	6.034** (1.320)	-9.406** (2.364)	-1.833† (1.380)
Inflexibility of technology	.636 (.634)	.029 (.269)	-.091 (.598)	.956 (.890)	.336 (.519)
Perceived environmental pressures	1.064† (.732)	.884** (.313)	.812 (.695)	-1.855* (1.088)	-.400 (.636)
Environmental condition ^c	4.751 (5.046)	-.656 (2.158)	1.763 (4.796)	-6.804 (7.666)	-3.775 (4.475)
Interaction terms					
Organizational size × environmental condition	-2.113 (1.860)	-.155 (.795)	-1.639 (1.767)	2.540 (2.929)	.861 (1.710)
Inflexibility of technology × environmental condition	.654 (.954)	.581† (.407)	1.780* (.904)	-1.454 (1.338)	.400 (.780)
Perceived environmental pressures × environmental condition	-.736 (1.140)	-.899* (.488)	.845 (1.084)	3.346* (1.639)	2.246* (.956)
Constant	-18.657 (.83)	-2.495 (.65)	-4.071 (.59)	62.695 (7.234**)	26.271 (.27)
R ²	23.442**	9.185**	7.234**	6.700**	1.752
F	42	43	43	41	41
n					

^a Unstandardized regression coefficients are reported, with standard errors in parentheses. R²s are unadjusted.

^b Size was measured as the logarithm of the number of employees in each firm.

^c Dummy variable with 0 = munificence, 1 = scarcity.

† $p < .10$

* $p < .05$

** $p < .01$

TABLE 3
Regression Coefficients of Contextual Variables Under Different Environmental Conditions^a

Structural Variables	Organizational Size	Inflexibility of Technology	Perceived Environmental Pressures	Constant
Functional specialization ^b				
Munificence	12.172** (1.390)	.636 (.634)	1.064† (.732)	-18.657
Scarcity	10.059** (1.235)	1.290* (.713)	.328 (.875)	-13.906
Difference	-2.113 (1.860)	.654 (.954)	-.736 (1.140)	4.751 (5.046)
Professional qualifications ^c				
Munificence	2.713** (.594)	.029 (.269)	.884** (.313)	-2.495
Scarcity	2.558** (.528)	.610* (.305)	-.015 (.375)	-3.151
Difference	-.155 (.795)	.581† (.407)	-.899* (.488)	-.656 (2.156)
Formalization of procedures ^c				
Munificence	6.034** (1.320)	-.091 (.598)	.812 (.695)	-4.071
Scarcity	4.394** (1.174)	1.689** (.676)	1.657* (.831)	-2.308
Difference	-1.639 (1.767)	1.780* (.904)	.845 (1.084)	1.763 (4.796)

pressure is significantly related to both measures of structural complexity—functional specialization and professional qualifications—under munificence but unrelated to structural complexity under scarcity. These results suggest that in munificent environments, organizations that perceive high environmental pressures tend to have a larger number of areas of specialization and to deploy professionally qualified staff in a greater number of areas. Such pressures, however, appear to have no significant effects on the level of structural complexity for organizations in environments of scarcity. The relationships between perceived environmental pressures and structural complexity under the two conditions are as hypothesized. The difference between the effects of perceived environmental pressures is also significant for professional qualifications. Thus, the results on professional qualifications completely support Hypothesis 1, and the results for functional specialization provide partial support for that hypothesis.

Perceived environmental pressure is significantly and positively related to formalization of procedures under scarcity but unrelated to formalization under munificence. These results confirm the positive relationship hypothesized for scarcity but do not support the hypothesized negative relationship for munificence. Furthermore, the difference between the two coefficients is not statistically significant. The results therefore provide only limited support for Hypothesis 2.

The pattern of relationships between perceived environmental pressures and centralization suggests a tendency toward decentralization under munificence and toward centralization under scarcity, as hypothesized. The coefficients of perceived environmental pressures are negative under munificence and significant for centralization of operating decisions. In contrast, the coefficients of perceived environmental pressures are positive under scarcity, and significant for centralization of strategic decisions. Furthermore, the differences between the coefficients of perceived environmental pressures are significant for the centralization of both operating and strategic decisions. These results suggest that in munificent environments, organizations that perceive high environmental pressures decentralize operating decisions, although strategic decisions are unaffected. Under scarcity, however, there is a tendency toward centralization, particularly the centralization of strategic decisions in organizations that perceive high environmental pressures. Thus, the significant effect of perceived environmental pressures on the centralization of operating decisions in munificent environments and the significant effect of perceived environmental pressures on the centralization of strategic decisions under scarcity support Hypothesis 3. The results further show that the effects of perceived environmental pressures on the centralization of both operating and strategic decisions are significantly different under conditions of munificence and scarcity.

Table 3 shows that inflexibility of technology is unrelated to the measures of structural complexity under munificence but significantly and positively related to those measures under scarcity. These results suggest that it is only under conditions of environmental scarcity that organizations with

more inflexible technologies tend to have higher levels of functional specialization and to deploy professionally qualified staff in a greater number of areas. The relationships between technological inflexibility and structural complexity under the two conditions are as hypothesized. The difference between the effects of technological inflexibility under the two conditions is also significant for professional qualifications. Thus, the results on professional qualifications support Hypothesis 4, and the results for functional specialization provide partial support for that hypothesis.

The relationships between inflexibility of technology and formalization of procedures are also as hypothesized. As can be seen, technological inflexibility is unrelated to formalization under munificence but positively and significantly related to formalization under scarcity. Furthermore, the difference between the coefficients for the two conditions is also statistically significant. Hypothesis 5 therefore receives complete support.

The coefficients of technological inflexibility are nonsignificant in the equations for both centralization of operating and strategic decisions, confirming that it is unrelated to centralization under munificence, as hypothesized. However, the results do not support the positive relationships hypothesized for scarcity. Furthermore, the differences between the coefficients for the two conditions are not significant. The results therefore provide only limited support for Hypothesis 6.

The coefficients of the logarithm of size are significantly positive for functional specialization, professional qualifications, and formalization of procedures. For centralization, the coefficients of size are negative, implying decentralization. These results show that larger size is associated with higher levels of functional specialization, deployment of professionally qualified staff in a greater number of areas, formalization of procedures, and decentralization. This pattern of relationships holds for both conditions of environmental munificence and scarcity. Although the coefficients of size are larger in conditions of environmental munificence than they are under scarcity for functional specialization, formalization, and decentralization, none of the differences between the coefficients for the two conditions are statistically significant. Hypothesis 7a is therefore supported.

The results reported pertain to organizations that range in size from 35 to 17,000 employees. Comparisons between simple regressions of structural characteristics on the logarithm of size and untransformed measures of size showed that the explained variations of structural variables were by far greater for regression equations using the logarithm than for those using the untransformed measure. The extra variation explained by the logarithmic measure was 47 percent for functional specialization, 34 percent for professional qualifications, 25 percent for formalization of procedures, 9 percent for centralization of operating decisions, and 5 percent for centralization of strategic decisions. These results indicate the superiority of logarithmic relationships between organizational size and structural characteristics.

In addition, for each structural variable, changes in the slope of the regression line at a threshold point of 1,000 employees were tested statisti-

cally. I used a piecewise regression technique (Neter et al., 1985: 346) to obtain the regression coefficients for size levels below and above the 1,000-employee level. The Appendix gives details of the method of estimation of coefficients. The results show that for each structural variable, the slopes of the regression lines are significantly different below and above the threshold point. Specifically, the slope of the regression line below the threshold is 39 times larger than the slope of the line above the threshold for functional specialization, 59 times larger for professional qualifications, 27 times larger for formalization of procedures, 12 times larger for centralization of operating decisions, and 14 times larger for centralization of strategic decisions. The larger slopes for organizations with fewer than 1,000 employees and the smaller slopes for larger organizations further supports the use of the logarithm of size. It also shows that structural variations are more sensitive to variations in size for small organizations than for large ones.

Hypothesis 7b stated that for small organizations, slopes of the relationships between size and structural characteristics are different under conditions of munificence and scarcity. In order to test this hypothesis, each structural variable was regressed on logarithm of size, the dummy variable representing environmental scarcity, and the cross-product between size and scarcity for a subsample of organizations with fewer than 1,000 employees ($N = 32$). The same pattern of relationships as reported in Table 3 emerged between structural variables and size under conditions of munificence and scarcity. Again, as for the full sample, the coefficients of all cross-product terms were insignificant. Thus, relationships between size and structure are also unaffected by conditions of environmental munificence and scarcity for small organizations. Hypothesis 7b cannot therefore be supported.

DISCUSSION

The results reported confirm some of this study's hypotheses about the differential effects of environmental munificence and scarcity on the relationships of context to the structures of organizations. Results on the effects of perceived environmental pressures suggest that in munificent environments, perceived environmental pressures may lead to greater structural complexity, measured in terms of functional specialization and professional qualifications, and the decentralization of operating decisions. Greater use of specialists and of professionally qualified staff coupled with decentralization of operating decisions may be an effective organizational response to constraints and competitive pressures in munificent environments. Such structural arrangements may allow timely responses to environmental demands.

On the other hand, in environments of scarcity, perceived environmental pressures were unrelated to levels of functional specialization and the extent of deployment of professionally qualified staff. However, the results suggest that perceived environmental pressures may lead to greater formal-

ization of procedures and the centralization of strategic decisions under conditions of scarcity. This pattern of structural response to perceived environmental pressures may reflect top management concern for increased efficiencies, tighter control of organizational activities, and greater control of decision-making processes intended to minimize faulty decisions.

The data also support the shift toward a more mechanistic structure with greater formalization, standardization, and centralization outlined in Staw and colleagues (1981) threat-rigidity model. The results reinforce the idea that organizational responses to scarcity parallel responses to crises and environmentally induced threats. Thus, much of the behavior that arises in conditions of scarcity may be due to a tendency for scarcity to assume the properties of a crisis and thereby threaten the continued viability of organizations.

Writers on crises have argued that the general responses of increasing efficiency and tightening control may be highly dysfunctional. Hedberg and coauthors (1976), for instance, suggested that centralization transfers authority to inappropriate people—those who have led the organization into the crisis. They further suggested that tight controls and great reliance on formalized procedures will inhibit strategic experimentation and drive away creative people. As a consequence, organizations will lose the ability for strategic reorientation that is essential for organizational survival. Staw and colleagues (1981) also suggested that such structural responses are highly dysfunctional when adversity results from radical changes in an environment. However, they further suggested that increasing efficiency and control may prove functional when causal relationships within an environment have not been altered and when the environmental changes that caused adversity are not radical.

The evidence presented in this study on structural responses under the condition of environmental scarcity is in line with much presented in previous descriptive and empirical studies on the effects of crisis, threat, and scarcity. However, the question of whether the structural responses observed are appropriate in advancing organizations' long-term viability remains unanswered. Future research could focus on performance implications of those structural responses. As suggested by previous researchers, the appropriateness of structural responses may depend on whether the environmental scarcity has resulted from radical or incremental changes in an environment. Investigation of performance implications would require a research design that incorporates measures of organizational performance and measures relating to the nature of the environmental changes that have caused scarcity.

Most past research on technology has assumed a uniform structural response to the technological imperative, but the hypotheses developed in this study allowed for the moderating effects of environmental munificence and scarcity on the relationships between technology and structure. This study focused on the effects of technological inflexibility on organizational structures and proposed that the need to protect an organization's core technology depends on the degree of technological inflexibility as well as on

the extent of environmental scarcity. Environmental munificence lessens the need for protection of a core technology, whereas conditions of scarcity amplify such need.

Results on technology showed that technological inflexibility has no effects on organizational structures in munificent environments but significantly affects structural complexity and formalization in environments of scarcity. The effects of technology on structure may thus depend on the nature of organizations' environments.

The present analysis bore out the idea that environmental munificence dampens the need for protection of a core technology. In munificent environments, differences in the structural characteristics of organizations with more or less inflexible technologies were not significant. On the other hand, in conditions of scarcity, where the need to protect core technologies becomes pervasive, inflexibility of technology may lead to greater structural complexity and greater formalization of procedures. Technological inflexibility, however, has no significant effect on the centralization of either operating decisions or strategic decisions in conditions of environmental scarcity.

The insignificant relationships between technological inflexibility and structural characteristics observed for organizations in munificent environments parallel the findings of previous studies of operations technology. Furthermore, the significant, positive relationships between inflexibility of technology and measures of structural complexity and formalization in environments of scarcity show that inflexibility of technology affects organizational structures only under that condition. These findings suggest that environmental conditions moderate technology-structure relationships. Lack of distinction between the effects of organizations' environments on relationships between operations technology and organizational structures thus may have confounded previous studies' findings.

An implication of the findings of this study relates to the administrative costs associated with inflexible technologies under conditions of scarcity. Although I observed no significant structural differences related to technological inflexibility under conditions of environmental munificence, results for conditions of scarcity suggested that organizations with more inflexible technologies may be burdened with additional costs of maintaining more elaborate administrative structures, despite environmental scarcity.

Results on relationships between size and organizational structures under munificence and scarcity suggest that environmental conditions do not affect the relationships between size and structure. The results revealed that larger size may lead to greater structural complexity, formalization, and decentralization in conditions of both munificence and scarcity. Furthermore, the size-structure relationships were not significantly different under the two environmental conditions.

These findings do not bear out Freeman and Hannan's (1975) and Ford's (1980b) propositions that changes in structure in response to changes in size are more extensive in conditions of growth (munificence) than in conditions of decline (scarcity). However, the findings of this study are based on a

cross-sectional analysis, so the effects of changes in size on structure were not observed longitudinally. Nonetheless, the results of this study suggest that munificence and scarcity do not affect relationships between size and structure across organizations.

The hypotheses advanced in this study were based on the properties of the functional relationships between size and structural characteristics. The logarithmic shape of the relationships suggests that structural variations due to variations in organizational size are more sensitive for small organizations than for large organizations. There may exist a threshold beyond which changes in size do not bring about as much change in the structure of large organizations. Consequently, beyond this threshold, any changes in size due to environmental munificence and scarcity may have little effect on structural characteristics.

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APPENDIX

An implication of a linear relationship between the size and structure of organizations is constancy of the slope and the intercept of the regression line over all values of the size variable. Piecewise regression techniques may be used to fit more than one regression line to subsamples of data and to test for constancy of the slope and the intercept over an entire sample (Neter et al., 1985). An indicator variable D was defined as $D = 1$ when size $\geq 1,000$ and $D = 0$ when size

$< 1,000$. Then, the multiple regression model $STRUCTURE = b_0 + b_1 SIZE + b_2 (SIZE - 999)D$ provides two piecewise linear regression equations, $STRUCTURE = b_0 + b_1 SIZE$ and $STRUCTURE = (b_0 - 999 b_2) + (b_1 + b_2)SIZE$ for $SIZE < 1,000$ and $SIZE \geq 1,000$, respectively.

In the above multiple regression model, b_1 gives the slope of the regression line for the relationship between size and structure for organizations with fewer than 1,000 employees; $(b_1 + b_2)$ gives the slope of the regression line for organizations with 1,000 or more employees; and b_2 gives the difference between the slopes of the two regression lines. A significant b_2 coefficient indicates that the two slopes are significantly different from each other. Further, $b_1/(b_1 + b_2)$ indicates the relative magnitude of the slopes of the two regression lines.

Masoud Yasai-Ardekani is an associate professor at the School of Business Administration, University of Wisconsin-Milwaukee. He received his Ph.D. degree in management studies from the Graduate Business Center, the City University, London. His research interests focus on studies of organizational structures and the design of strategic planning systems.

WHAT THEY DO WHEN THEY GET YOUR MANUSCRIPT: A SURVEY OF ACADEMY OF MANAGEMENT REVIEWER PRACTICES

LAWRENCE R. JAUCH

JERRY L. WALL

Northeast Louisiana University

This study seeks to promote an understanding of the practices of reviewers for the Academy of Management's *Journal (AMJ)* and *Review (AMR)*. A survey of reviewers for the two journals revealed that the practices of those reviewing empirical articles for *AMJ* varied little from the practices of those reviewing nonempirical articles for *AMR*. Factor analysis revealed three dimensions of significance identifying differences among reviewers' practices. We termed them thoroughness, guidance, and substance. Further analysis of indexes derived from those factors and their correlates provided insight into forces at work in reviewers as they participated in the review process.

Conscious of guilt and fearful of the light,
They lurk enshrouded in the veil of night,
Safe from detection, seize the unwary prey,
And stab, like bravoos, all who come that way.

—Charles Churchill¹

Academics attempting to publish articles in professional journals may see reviewers in the caustic light of our epigram. But does this portrayal fit the typical reviewer for the Academy of Management? Many would like to know. Much of an academic's life is spent in writing and evaluating, and there is little doubt that success in publishing articles can have a significant impact on academic careers (Hunt & Blair, 1987). Hence, knowledge about the reviewing process would be interesting and useful to many academics.

Insights about the entire editorial process can be gleaned from a careful reading of a wide range of introspective and research-based literature in the organizational sciences (Campbell, 1982; Kerr, Tolliver, & Petree, 1977; Lindsey, 1978; Pfeffer, Leong, & Strehl, 1977; Whitley, 1970; Wolff, 1970). In particular, a recent book by Cummings and Frost (1985), which provides a variety of perspectives from authors, editors, reviewers, and readers, deserves close attention from anyone involved with journal publishing.

Although this body of literature is useful, for the most part it neglects to examine systematically the processes used by a body of reviewers that ultimately lead to their recommendations to editors. Except for the occasional

¹ This quotation appears in Peyre (1967).

piece on an individual's approach toward reviewing empirical papers (e.g., Schwab, 1985), reviewers as a group have not often been asked to reveal much about the processes they use to review theoretical or empirical works, especially in the management journals. This dearth of knowledge prompts questions like the following: What do reviewers do when they receive a manuscript from an editor? Do reviewers review differently? Do reviewers of different types of journals review differently? The present research sought to address those issues, seeking to provide insights into the review process and to enhance understanding of the practices of reviewers.

WHAT IS KNOWN ABOUT REVIEWING

Seemingly diverse responses to a manuscript from reviewers and the resulting editorial decision sometimes confound or anger authors (Frost, 1985). Indeed, the results of correlation studies on reliability between referees appear disturbing in terms of scientific norms, for they do not bear out the assumption that referees consistently apply universal criteria based on scientific, objective, and common standards for evaluating manuscripts. Lindsey's (1978) review of ten studies on interjudge reliability in the review process reported correlations ranging from .07 to .84 for agreement between reviewers regarding particular manuscripts. Lindsey indicated that reviewers emphasized different standards. Further, most studies (e.g., Bowen, Perloff, & Jacoby, 1972; Gottfredson, 1978) have reported correlations of less than .30. However, most of those studies have not indicated whether the papers being reviewed were purely theoretical, like those published by the *Academy of Management Review* (AMR), or empirical like those in the *Academy of Management Journal* (AMJ). We would expect higher reviewer agreement where there are well-developed paradigms (Lodahl & Gordon, 1972). Yet Scott (1975) found that the lowest levels of reviewer agreement on empirical papers concerned criteria for adequacy of research design.

The speculation that reviewers who use different standards may violate the norms of science was supported by one experiment in which 30 "pseudo-manuscripts"—slightly modified versions of papers already published—were sent back to the journals in which they had appeared 18–32 months before (Peters & Ceci, 1980). Reviewers recognized only 10 percent of the masquerades as such, and only 14 percent of the remainder were found acceptable for publication.

Arguments that intraclass correlation is an inappropriate method for judging interrater agreement partially discount such indictments (Campbell, 1982). For example, Crandall (1978) reanalyzed correlation data showing low agreement by directly comparing pairs of reviewer recommendations to editors. He found complete agreement for 33 percent of the cases, variation by only one point for 27 percent, and total disagreement for only 4 percent. Those results were similar to data from a psychology journal (Scarr & Weber, 1978) in which 78 percent agreement was found on the reject or reject-resubmit categories, the two most critical areas of advice to an editor. Given

that editors often choose reviewers with differing areas of expertise to get contrasting perspectives, such a degree of reviewer consistency seems understandable.

The foregoing findings suggest that there might be differences in how reviewers approach their task. An examination of the process by which reviewers handle an article could lead to an explanation of some of those differences. Previous research has suggested that an underlying ideology about the appropriate role of a reviewer influences what reviewers do, the recommendations they make, and how they are made. The literature on reviewer roles is potentially enlightening.

Some work (e.g., Crane, 1967) has suggested that the major role of a reviewer is to serve as a "gatekeeper" who protects journals against publishing shoddy work. For example, Beyer noted that reviewers "are looking for something in a submission that justifies not publishing the article, and given the low consensus in the social sciences over many issues, they usually find it" (1978: 82). High rejection rates and occasionally caustic feedback may lead many authors to assume that reviewers are critical gatekeepers. Yet authors' observations, based on the piecemeal evidence of rejection or acceptance comments, hardly provide a good foundation for conclusions about how reviewers approach their task.

Some researchers have reflected on role definitions other than the gatekeeper function. Pondy (1985) described reviewers as taking the role of an attorney and argued that although they have an obligation to the "court system," they might treat their "client-authors" in ways that protect the authors from the biases in the system and assist them in "presenting their case." Rousseau (1985) suggested that reviewers' roles vary with circumstances and range from that of critic to that of mentor or advocate (defense attorney). Daft (1985) described both the evaluative and developmental components of a reviewer's job. Although they are useful reports from single reviewers, these descriptions and prescriptions are highly individualized and provide little insight into how reviewers as a group pursue their activities.

One study (Cummings, Frost, & Vakil, 1985) has provided some insight based on content analysis of files for each of 27 referees of the *Academy of Management Journal*. They identified two dominant reviewing styles, "coach" and "critic," through analysis of archival communications with the editor; some reviewers studied, however, did not possess a clearly recognizable style of reviewing. This study found that both coaches and critics were "good reviewers." Reviewers in both groups were thorough and attentive to detail, and they emphasized methodology and substantive matters to a greater extent in making their decisions than did reviewers without a dominant style. Hence, a combination of commitment and effort led to what the investigators termed good reviews, even though reviewers differed in their degree of criticism. All these reviewers were dealing with empirical studies for which methodology might be a more dominant concern than other criteria. Since AMR articles are not empirical, AMR reviewers may use different

criteria from *AMJ* reviewers or otherwise process manuscripts differently. For example, empirical work could be evaluated on the basis of methodological appropriateness, whereas theoretical pieces are possibly subject to more interpretive evaluation by a reviewer as to their adequacy. We would expect *AMR* reviewers, as a whole, to report taking a longer time to read articles than *AMJ* reviewers and also to report that criteria for evaluation are less clear (Beyer, 1978). Using a methodology different from that of Cummings and colleagues (1985), the present study examined reviewers from both the empirical *AMJ* and the nonempirical *AMR*.

RESEARCH QUESTIONS

Our survey of previous literature on reviewing activities suggested three interesting questions. First, how do Academy of Management reviewers typically process manuscripts? Second, how do reviewers differ from one another as they perform their task? Third, are there differences between *AMR* and *AMJ* reviewers?

METHODS

Instrument and Respondents

Curiosity about reviewing practices led the senior author to construct a questionnaire and to send it to 48 of the 51 *AMR* board members in August 1985. (The editor, the book review editor, and the author were excluded from the population.) Using an introspective protocol-recall procedure suggested by Schwab (1985) to develop a hypothetical review process, I generated 38 items dealing with the initial receipt of manuscripts, concerning, for instance, decisions to be taken in light of familiarity with topic or authors; manuscript review, including citation checking and note making; manuscript evaluation, or application of criteria; remarks to authors; and revisions. All items appear in Table 1. Respondents were asked to circle, on a 5-point scale, the frequency with which the action indicated in these 38 process items represented their typical practice. Open-ended questions at the end of each section allowed respondents to clarify answers. Finally, there were four questions asking respondents to report on the time burdens associated with the review process and four on reviewing experience.

Two years later, a modified version of the instrument was hand-delivered or mailed to 50 members of the *AMJ* review board as the result of suggestions from both the *AMJ* editor and two reviewers of an earlier manuscript describing the *AMR* results. Four questions concerning methodological issues that were not germane to *AMR* were added to the questionnaire. The junior author reviewed all existing items for relevance on the basis of his experience; he acted as the editor of an empirically-oriented journal for six years, edited a practitioner-oriented journal for three years, and has served as a regular and an ad hoc reviewer.

Responses were received from 39 of the 48 *AMR* reviewers (81%) and

from 34 of 50 AMJ reviewers (68%). The high response rate from the population reduced the need to do a follow-up of nonrespondents to examine potential bias.

Analytical Procedures

To determine the review process used by a group of reviewers, we tabulated descriptive statistics for the respondents as a whole. The means and standard deviations provided a basis for interpreting typical reviewer activities and background information regarding reviewing time and experience.

Several analyses were then performed in order to ascertain differences among reviewers. Initially, trying to replicate the results of Cummings, Frost, and Vakil (1985), we looked for the coach and critic reviewer styles they found. We chose 15 items that appeared to identify coaches and critics from the questionnaire and subjected them to factor analysis using varimax rotation, since Cummings and colleagues argued that the two styles are independent. Examination of the results did not support the coach-critic duality but led to a more detailed examination of the methodology underlying the conceptualization of the two roles. The roles were derived from an analysis of editorial correspondence rather than from self-reports by reviewers. Cummings and his coauthors examined whether and to what extent these roles influenced eight dimensions of the manuscript review process, which they called thoroughness, amount of technical detail, significance of technical detail, wisdom, methodological emphasis, quantitative/qualitative, substantive, and style. Hence, these process dimensions became the basis for further analysis of responses to the present study's questionnaire.

Drawing on sections of our questionnaire related to the operational definitions of those eight dimensions, we selected 13 items and factor-analyzed them using oblique rotation on both groups of reviewers (AMR and AMJ) since we could not assume that any resulting factors were orthogonal. We created three indexes on the basis of the factors that emerged and named them thoroughness, guidance, and substance. The variables identified as loading on those factors include all items selected for this specific factor analysis. The Appendix gives further details on these and all other indexes developed.

The next step in the analysis process was to determine whether the three identified indexes of reviewer practices related to other self-reported reviewing activities or reviewer characteristics. We factor-analyzed three other sets of items to obtain a parsimonious set of variables. A first set, treating all items dealing with criteria for manuscript evaluation, resulted in two indexes, *gestalt* and *criteria*; a second factor analysis, including all questions on revisions, also resulted in two indexes, *attention* and *revision*; a third, treating all remaining items, failed to converge and hence gave no meaningful results.

As noted in the Appendix, we also tallied comments critical of this study's instrument to obtain the *criticism* index and tallied both explanations of responses and criticisms for the *explanation* index. These were

TABLE 1
Descriptive Data on Variables^a

Variables	Means	s.d.
Initial receipt		
1. Within two days of receipt I read the paper to determine my expertise.	3.5	1.1
2. I read the entire paper to determine my expertise to review.	2.5	1.3
3. If unfamiliar with topic, I notify the editor within two days.	2.5	1.3
4. Within one week, I preread the manuscript to get a sense of it.	2.6	1.1
5. I am generally aware of the likely author of the paper.	3.6	0.7
6. If I know the author, I decline to review.	3.2	1.3
Manuscript review		
7. After prereading, I wait a few days to review the paper.	2.7	1.3
8. When not intimately familiar with the topic, I check other sources.	2.9	1.3
9. I look up citations to unfamiliar literature.	3.2	1.0
10. I read original citations if the author's interpretation differs from mine.	2.5	1.2
11. I make notes on the paper as I read it.	1.2	0.5
12. I outline reactions and reread the paper.	1.7 ^b	0.9
13. I read the paper at least twice before preparing comments.	2.0	1.0
14. I discuss parts of a paper I'm uncertain about with local colleagues.	3.1 ^b	1.2
15. I discuss parts of a paper I'm uncertain about with external peers.	4.1	0.9
16. I share an interesting paper with colleagues and students.	3.7	1.2
Evaluation criteria		
17. I complete the rating form before making final conclusions and recommendations.	3.0	1.5
18. One or two criteria predominate in my recommendation to the editor.	2.3	1.1
19. The entire pattern of criteria influence my decision.	2.7	1.2
20. Before rating the criteria, I have already made up my mind.	2.1	0.8
21. The criteria have little or no impact on my decision.	2.9	1.5
Remarks to authors		
When appropriate, I try to point out:		
22. Flaws in the logic.	1.4	0.7
23. Holes in the theory.	1.3	0.5
24. Missing literature or variables.	1.7	0.8
25. Problems of conveying meaning.	1.6	0.7
26. Disagreements with issues.	1.8	0.9
27. Reasons for disagreements with arguments.	1.6	0.8
28. Questions to be addressed.	1.8	0.9
29. How to better focus a manuscript.	2.0	0.8
Revisions		
30. I ignore the first version entirely.	3.6	1.4
31. I read the original paper <i>before</i> I read a revision.	3.8	1.2
32. I read the original paper <i>after</i> I read a revision.	3.7	1.0
33. I read the reviewer comments <i>before</i> I read a revision.	1.7	0.9
34. I read reviewer comments <i>after</i> I read a revision.	3.6	1.4
35. I read author reactions <i>before</i> I read a revision.	1.7	1.0
36. I read author reactions <i>after</i> I read a revision.	3.5	1.3
37. I use the same criteria for revisions as for the original.	1.7	0.9
38. I expect a revision to address comments of original review.	2.1	1.2

TABLE 1 (continued)

Variables	Means	s.d.
Reviewing time		
39. Total hours per paper for a typical complete review process.	5.4 ^b	3.6
40. Least hours needed to review a paper.	2.1 ^b	1.5
41. Most hours spent with a single paper.	12.5	12.1
42. Most hours spent with resubmitted paper.	6.4	6.2
Reviewing background		
43. Months served on board.	25.5	19.1
44. Served as a reviewer for # "theory" journals.	3.1	7.8
45. Served as a reviewer for # "empirical" journals.	2.6	2.9
46. Frequency of service as ad hoc reviewer. ^c	1.4	0.6

^a All variables except time and background were rated on a Likert scale with always = 1 and never = 5; *N* = 73 except for a few variables with missing data.

^b A *t*-test revealed significant differences between AMJ and AMR reviewers.

^c 1 = frequent, 2 = occasional, 3 = rare.

examined because they figured in Cummings and colleagues' list of review characteristics. Since we believed time to be an important characteristic of the review process, we created the time variable by aggregating all four variables from the section of the questionnaire on reviewing time. Finally, we captured the reviewer characteristic of experience by summing four variables for the experience index.

The resulting indexes were correlated with one another and with the item identifying journal in order to determine relationships between reviewer practices and characteristics and to reveal patterns of differences between reviewers. To determine whether any differences existed across reviewers for the theoretical and empirical journals, we used *t*-tests to compare AMJ and AMR reviewers on each variable and index.

RESULTS

How Do Reviewers Typically Process Manuscripts?

Table 1 provides the basic data describing the responses to the items on the questionnaire. Although some questions elicited strikingly similar responses from most respondents, others produced substantial variation. The following describes a common pattern followed by a majority of reviewers.

Most reviewers say that they either read an entire manuscript or skim it within a week of receiving it to determine their expertise and obtain a sense of the work. Two reviewers shared their "ideal model," which we paraphrase as follows:

I determine if I should review the paper on the basis of (a) the topic's fit with my expertise, (b) true blind review, (c) potential bias from my own work. If anything is doubtful, I notify the editor to discuss whether to proceed or return the paper.

A typical pattern includes making notes on the manuscript as it is read, outlining reactions, and then rereading it before preparing comments. One respondent commented:

I make notes on the margins; I review my notes; I write some reactions and reread portions of MS; I fill out page 1 [the rating form]; I review margin notes and write two pages of comments on all my notes.

Reviewers are unlikely to discuss a paper with external peers, nor are they likely to share papers with local colleagues or students. Perhaps one respondent's comment typifies a common practice: "On rare occasions, I may ask a colleague a question about literature, but not [about] the entire paper." Respondents explained why such discussion is rare in several ways: "I don't need peer feedback, because I'm the expert"; "I don't want to bother my peers"; "I don't want to reveal my ignorance."

The rating forms contain several criteria to help reviewers make recommendations to an editor about the disposition of a manuscript, with the choices being to accept, to advise revisions, and to reject. As reviewers prepare their final evaluations, they tend to have already made up their minds as to final disposition, with one or two criteria dominating their recommendation. The most consistent comment was "It is impossible to consider all criteria since they are not equally important."

This comment and the pattern of responses to questions on "remarks to authors" suggest that, regardless of the final recommendation, many reviewers feel obligated to indicate to authors what problems in manuscripts require resolution. Responses on remarks to authors were characterized by high consistency and little variation. Believing that "this is the most constructive part of the review," several reviewers remarked that they tried to prepare two or three single-spaced pages of comments with lots of detail in order to promote better scholarship and writing.

Some typical elaborations on reviewer comments were:

I focus on serious concerns that would stop me from recommending publication and suggest concretely what the author can do to eliminate these concerns.

I try to overcome my own bias and guide in a way that improves the author's paper, not my interpretation of what the paper should be like.

Many authors link their revision to the first version and expect reviewers to see and appreciate the connection. However, the evidence suggests that what reviewers pay attention to are the comments of other reviewers and the author's reactions, not the original manuscript itself. Further, reviewers tend to read reviewer comments and author reactions before reading a revision; they then apply the same evaluation criteria to the revision that they applied to the original manuscript. Reviewers usually expect that a revision will adequately address comments made on the original reviews. As two respondents noted:

Revisions are rhetorical arguments and present problems; I'm open to disagreement with my suggestions, but I want good reasons and improved clarity in the manuscript. I'm also influenced by the second reviewer's initial comments.

Failure to address substantive or major points of a criticism cause problems in evaluating the revision.

The foregoing suggests that substantial time is spent in performing a typical review. Indeed, assuming an average of 1.5 papers a month, a typical reviewer will devote about one full work day a month to the review process for one of these journals alone. Revisions tend to consume even more time, since reviewers read additional correspondence and some compare revisions to the original work.

As for experience, most reviewers have served on multiple review boards or have frequently done ad hoc reviewing. The data on time on a board were confounded by the fact that the time frame differed for the two journals studied; the questionnaire was administered in the last year of the editor's term for *AMJ* and in the first year of the editor's term for *AMR*.

How Do Reviewers Differ from One Another as They Perform Their Task?

The factor analyses described earlier were used to help determine whether there were different patterns of reviewing practice. We created summed indexes for all variables loading at .50 or higher on a factor (see the Appendix). These indexes differentiated reviewers' practices.

As indicated earlier, reviewers differ along dimensions called thoroughness, substance, and guidance. The thoroughness index comes from the sections of the questionnaire on initial receipt and manuscript review. Both the substance and guidance indexes come from the section dealing with comments to authors. These three factors accounted for 57 percent of the variance, and all had eigenvalues greater than one.

Reviewers scoring high on thoroughness emphasize the following in the review process: skimming; waiting for a few days to think about the manuscript or to check other sources; reading the manuscript at least twice; and checking citations and back issues of the journal and original sources, particularly when the reviewer is either unfamiliar with the topic or differs with the author in interpretation of literature. Thus, thorough reviewers would ensure they were very knowledgeable about both subject matter and manuscript. A high score on the substance index suggests that reviewers would focus on pointing out flaws in logic or theory; raising specific disagreements about issues, arguments, and assumptions; and explaining why they disagree. Reviewers high on guidance would tend to emphasize pointing out omissions, indicating issues that need to be addressed, and suggesting how a manuscript could be better focused.

Some reviewers might emphasize all three dimensions and others might emphasize one set or another. We created a composite measure by categorizing reviewers into three groups: (1) those who scored at or above the median on all three indexes, (2) those who scored below the median on all three, and (3) those who had any other combination of scores on the indexes. Under this typology, 14 percent of the respondents fall in group 1, 21 percent are in group 2, and 65 percent are in group 3. Attempts to compare this

typology with other variables and indexes proved fruitless; nonetheless, each of the components provides additional understanding of reviewer differences.

Table 2 presents the intercorrelations of all indexes. As might be expected, thorough reviewers clearly devote substantially more time to the review process. The thoroughness dimension is also significantly correlated with the attention dimension, indicating that thorough reviewers continue their pattern into the revision stage; that is, they do not treat revisions as new documents, and they reread the original manuscript both before and after reading the revision. Thoroughness is also correlated with the gestalt dimension. When completing the criteria section of the rating form for final recommendation to an editor about a manuscript, the reviewers high on this dimension have not made up their minds, complete the rating form before making a final decision, and consider the entire pattern of criteria on the rating form.

Guidance and substance are significantly correlated, yet there are differences between the two as to correlations with other indexes. Both guidance and substance are correlated with the criticism dimension, but guidance is correlated with explanation and substance with attention. This pattern seems to indicate that reviewers scoring high on substance emphasize the technical content of manuscripts, focus on detail, and treat revisions as independent from an initial submission. Reviewers high on guidance, although also concerned with technical content, appear to make efforts to elaborate on their ideas. For instance, one reviewer wrote:

I'm primarily concerned with originality of the contribution of the material. This is the most important factor to me and is subsumed in the rating scale. An original article can always be made publishable with appropriate guidance.

Correlations provide additional insight into important aspects of the review process. When reviewers handle revisions, the extent to which the original manuscript is considered varies. More thorough reviewers pay more attention to the original, but those who focus on detail and are high on the criticism dimension pay less attention to the original version of a manuscript.

Unexpectedly, the only significant correlate with experience is time. Those with more experience report that it takes them more time to perform reviews.

As for manuscript evaluation, recall that thorough reviewers tend to use a holistic approach, represented by the gestalt dimension. Gestalt is also related to the explanation index: those who provide comprehensive elaboration also tend to take a holistic approach to evaluation. The final dimension of evaluation, criteria, is correlated with the journal variable. The use of formal criteria and the focus within those criteria vary across the two journals ($t = 3.19$, $p = .01$). *AMJ* reviewers tend to focus on one or two of the formal criteria. *AMR* reviewers appear to be less confined by the formal

TABLE 2
Intercorrelations of Indexes^a

Indexes	Means	s.d.	Mini- mum	Maxi- mum	1	2	3	4	5	6	7	8	9	10	11
1. Time	24.3	15.6	8	88											
2. Experience	5.8	2.2	1	9	.28**										
3. Journal ^b					-.04	.15									
4. Thoroughness	15.8	5.1	7	29	-.28**	-.06	-.05								
5. Guidance	5.6	1.9	3	9	-.04	.06	.25**								
6. Substance	6.1	2.2	4	12	-.14	.02	.04	.02	.48**						
7. Criticism	0.9	1.2	0	5	-.05	-.12	-.03	.06	-.36**	-.27**					
8. Explanation	2.8	2.6	0	11	.07	.03	-.10	-.10	-.20**	-.17	.58**				
9. Attention	9.9	2.5	4	15	-.16	.09	-.01	.31**	-.18	-.20*	.22*	.16			
10. Revision	3.9	1.6	2	10	-.11	-.14	-.07	-.01	-.07	.05	.28**	.09	.07		
11. Gestalt	9.4	2.6	4	15	.13	.09	.00	.21**	.04	.01	.08	.27**	.03	-.13	
12. Criteria	5.2	2.0	2	10	-.10	.09	-.37**	.19	.03	.07	.07	.08	.19	.02	.07

^aThe Appendix describes the indexes. High values for variables 1, 2, 7, and 8 reflect increasing presence of the characteristic; high values for other variables (except "journal") reflect decreasing presence of the characteristic.

^bThe mean, standard deviation, and minimum and maximum values for "journal" were not meaningful.

* $p = .05$

** $p = .01$

evaluation criteria and use a broader set of criteria to evaluate manuscripts. The only other variable significantly correlated with journal was guidance. There was a tendency for AMR reviewers to provide more guidance ($t = 2.21, p = .03$), perhaps because the criteria for evaluation of AMR manuscripts are less well defined than those for AMJ manuscripts.

Are There Differences Between AMR and AMJ Reviewers?

Aside from the differences noted in the discussions of the first two research questions regarding emphasis on criteria and guidance, only four variables emerge as significant from t -tests comparing journals. AMR reviewers are more inclined to outline their reactions and to reread a manuscript than are AMJ reviewers ($t = -2.4, p = .02$). AMR reviewers are less likely to discuss a manuscript with colleagues than are their AMJ counterparts ($t = 1.95, p = .05$). AMJ reviewers tend to spend less time than AMR reviewers on those manuscripts on which both groups indicated they spent the least time ($t = 2.58, p = .01$). Finally, AMR reviewers typically take more time to review manuscripts ($t = 2.08, p = .04$).

DISCUSSION

What have these reviewers told us about how they work? Respondents reported that reviewing is a demanding, difficult, and time-consuming task. Most of them indicated that they seek to ensure that they are familiar with the content of a manuscript and its topic. They carefully read manuscripts, often double-checking some parts. However, some reviewers are more thorough than others.

Thoroughness and its correlates revealed that reviewers vary in the degree to which they prepare themselves for the review process and in how they carry it out. Clearly, the more thorough reviewers invest more time in the process. It is interesting that thoroughness is not significantly related to substance or guidance. Apparently, thoroughness bears little relationship to the interaction between a reviewer and an author; the comments returned to the author may reveal little about the extent of the reviewer's preparation or time invested. Hence, authors should be reluctant to draw conclusions about a reviewer's attention to a manuscript on the basis of the nature or extent of written feedback. Short comments do not mean that a reviewer has not done a thorough job, just as a long list may not mean thoroughness.

The nature of written feedback to authors appears to split into two related dimensions—substance and guidance. A high index score on substance reveals a tendency to focus on the underlying content of a manuscript, especially on flaws in logic or theory, assumptions and arguments, and sources of disagreement. On the other hand, reviewers scoring high on guidance tend to be more developmental in their approach in that they make specific comments about omissions, issues to be addressed, and ways to focus the manuscript and improve it. As two reviewers wrote:

I find I comment a lot regarding "expand this section," "this section unclear," "what questions are being answered here," "what are the research implications."

I write many comments, which is very time consuming. I usually make some general overriding point most critical to the paper. Then I also provide a detailed point-by-point critique linked to page, paragraph, and specific lines.

Those reviewers who provided much guidance in the review process tended to make more critical comments on the questionnaire and to offer more explanation of their responses to it than did other respondents. Those explaining their responses were less likely to prejudge a manuscript and tended to use a holistic set of judgment criteria, consistent with the finding that the substance dimension was significantly correlated with criticism but not with explanation. In other words, reviewers who focus on technical content (substance) may not take the next step and provide guidance for improvement. This suggests that the coach-critic distinction may have some validity, even though these self-report data did not directly confirm those roles.

In terms of decision making about a manuscript, since more thorough reviewers appear to consider the entire pattern of criteria before making a decision, they appear to have formed a gestalt about the value of the manuscript. In contrast, less thorough reviewers may focus on specific criteria, such as what reviewers identify as "fatal flaws." As one reviewer commented, "Sometimes it is clear that it is a bad manuscript and not worth my time." *AMJ*'s reviewers differ from *AMR*'s when it comes to evaluation criteria. Because articles submitted to *AMR* do not use empirical methodologies, applying an indefinite set of criteria is more likely for *AMR* reviewers than for *AMJ* reviewers, who can focus on technical issues of methodology. As one reviewer noted, "A composite set of criteria of a hazy nature are used since evaluation is complex, multidimensional, and has nuances the criteria don't capture." For *AMR*, variance on application of criteria seems bound to occur because of the interpretations required by imprecise decision rules, whereas *AMJ* reviewers may focus on one or two criteria. For example, one noted:

Some criteria bear more weight than others for specific papers.
The priority of criteria is most critical in rejecting a manuscript,
especially the criteria on contribution or expanding knowledge
in a given area.

Others may focus on what one called a "fatal method flaw." The flaws in "theory-review" papers may be difficult to detect, which may account for *AMR* reviewers' higher scores on guidance. Perhaps there is a greater need to clarify the nature of problems with an *AMR* manuscript. Such guidance, in the form of written comments, tends to consume a bit more time for the typical *AMR* reviewer.

When processing revisions, less thorough reviewers do not tend to spend their time reading earlier versions of articles and hence treat revisions as new documents. Those emphasizing substance treat revisions as new, but those high on guidance spend time rereading initial submissions for comparison with revisions. As one reviewer noted:

Usually I mention differences in interpretation of literature in my review and suggest the author double-check the citation. On a resubmission, I would then check the original interpretation and then check the original citation.

Experience was expected to make a difference in reviewing practices. For instance, those who had done little reviewing might be expected to take more time than experienced reviewers. Those with more experience might become jaded in their outlook and perhaps grow very critical. The findings did not support those expectations. Indeed, those with much experience took more time to review than the relatively inexperienced. However, the finding may simply be a statistical artifact, since experienced reviewers have had more opportunities to experience extremes in the amount of time various manuscripts demand.

A few other words of caution are in order in interpreting these results. First, the data are self-reports of typical practices. Respondents may have inaccurately described their actual practices. Those who are less secure may give expected or professionally acceptable responses (Zerbe & Paulhus, 1987). There is no evidence to support or refute that possibility, though one reviewer commented that the reviewing process is "fraught with uncertainty." Further, actual practice may diverge from what was stated as typical. And the use of "usually" or "occasionally" response options to describe average or typical practice requires an estimation on the part of a respondent. Use of a different technique, such as a diary method, might avoid some of these limitations, but, given the time constraints on most reviewers, it would be highly unlikely to be successful.

Second, because AMR reviewers responded near the beginning of that editor's term and the AMJ reviewers responded toward the end of their editor's term, there may be some maturation effects in the data. In addition, we excluded the four questions asked of AMJ reviewers but not of the AMR reviewers from the analysis. Missing data for AMR would have confounded results, and those items were not germane to AMR articles or to the review process as presented here.

Third, even with the high response rate that the current study enjoyed, it still suffered from the problem of small data sets when the analysis was split into AMJ and AMR subgroups. However, those subgroups are substantially larger than those used in other studies, such as the group of 16 on which Cummings and colleagues (1985) based their findings, and they represent, in effect, populations of interest.

Finally, some variables contained relatively low variance, which may have reduced our ability to replicate the coach-critic finding. Further, differences in the methods used to collect data—self-reports here versus content analysis in Cummings and colleagues—may account for the absence of such role definitions in the present results.

Further research might be done to discern whether the reviewing patterns found here are stable and if they exist when academics evaluate other types of work. For example, professors frequently evaluate book manu-

scripts, student papers, colleagues' credentials, and papers for professional meetings, as well as journal manuscripts. It could be that an individual's evaluation pattern is generalizable to all types of evaluations. Some reviewers may tend to quickly dispense with tasks seen as onerous but necessary to this profession. As an unknown reviewer commented, "I have found it to be a demanding, difficult, time-consuming, and very thankless task."

IMPLICATIONS AND CONCLUSIONS

No doubt some authors who have received negative feedback may question these findings. We believe that all reviewers may provide guidance or focus on substance at some time and their doing so may often be perceived as negative. However, an author's time and psychological investment in a piece of work is likely to lead to defensive reactions to any sort of criticism of that work. If coupled with a rejection, even positive suggestions for improvement from reviewers are likely to be interpreted in a negative way. Hence, authors are not in a good position to verify whether these findings accurately reveal how reviewers behave. Moreover, these findings suggest that the nature of comments does not necessarily reflect the thoroughness of a reviewer: their extent and quality may reveal little of the total review process or preparation for review. Thus, comments may not reveal to authors the effort a reviewer has made.

It is clear that reviewers vary along certain dimensions. We do not know how stable the reviewing patterns found here are; they may be subject to external influences. Editorial instruction might influence reviewers, as it would seem reasonable that they would be sensitive to comments from the editors. This may have accounted for some differences between AMJ and AMR reviewers. Hence, editors should be sure that they clearly articulate their goals to reviewers. Reviewer style differences can also influence the editorial process and reactions of authors to it. Hence, editors should be sensitive to reviewers' styles as well as expertise. For example, editors may attempt to pair reviewers—such as one typically high on guidance with one usually emphasizing substance—of a manuscript to provide balance of perspectives. Editors should consider selection of reviewers, correspondence with them, and interpretation of feedback when making explanations in their correspondence with authors.

In effect, this study, although potentially interpretable as self-serving, suggests that most Academy of Management reviewers don't fit the role of caustic critic portrayed at the start of this article. Rather, this study provides a picture of involved professionals who commit substantial time to their discipline and to their colleagues, making efforts to improve the crafts of research and writing.

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APPENDIX

The following indexes were calculated from the variables identified in Table 1. **Time:** The sum of variables 39 through 42; represents overall total hours spent in various types of reviewing. **Experience:** Represents amount of experience as a reviewer. Categorization was necessary because of nonstandardized underlying response options. Sum of variables 43 through 46, recoded as follows: service on the board, 1 year or less = 1, greater than 1 year to 3 years = 2, more than 3 years = 3; number of journals served (44 and 45), 0 = 0, 1 = 1, else = 3 (to reflect no service, some service, or extensive service); service as ad hoc reviewer, 1 = 1, else = 0 (to reflect the fact that most respondents frequently perform ad hoc reviews). **Journal:** AMR was coded as 0, AMJ as 1. **Thoroughness:** One of three indexes of reviewer practices; the sum of variables 4, 7, 8, 11, 12, and 13. Reflects the degree to which reviewers ensure they are knowledgeable of the subject matter and the manuscript. **Guidance:** The second index of reviewer practices; the sum of variables 24, 28, and 29. The extent to which reviewers provide authors with specific written comments about how to improve a manuscript. **Substance:** The third index of reviewer practices; the sum of variables 22, 23, 26, and 27. The degree to which reviewers make specific comments and explanations about various flaws in a manuscript. **Criticism:** The number of comments by a respondent criticizing the format, or items of this study's questionnaire, interpreted as a reviewer's tendency to make critical comments. **Explanation:** The total number of open-ended comments by a respondent, includes all explanatory and critical (see "criticism") comments; interpreted as a reviewer's tendency to elucidate. **Attention:** One of two indexes of items dealing with revisions: the sum of variables 30, 31, and 32. Item 30, which had a negative factor loading, was reverse-coded in order to be consistent with the other two items. The degree to which reviewers compare the content of a revised manuscript to the original version. **Revision:** The second index dealing with revisions; the sum of variables 37 and 38. The extent to which reviewers evaluate a revision similarly to the original version. **Gestalt:** One of two indexes of items dealing with evaluation criteria; the sum of variables 17, 19, and 20. Item 20, which had a negative factor loading, was recoded for consistency with the other two items. The tendency for reviewers to take a holistic approach to evaluating manuscripts. **Criteria:** The second index of evaluation criteria; the sum of variables 18 and 21. The degree to which reviewers focus on a limited set of evaluation criteria.

Lawrence R. Jauch is the Biedenharn Professor of Management at Northeast Louisiana University. He received his Ph.D. degree from the University of Missouri. His research usually focuses on strategic management and elites in organizations.

Jerry L. Wall is a professor of management and the director of the Center for Business and Economic Research at Northeast Louisiana University. He received his Ph.D. degree from the University of Missouri. His current research interests are decision aids to economic and business development.

RESEARCH NOTES

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COGNITIVE REEVALUATION OF OUTCOMES IN RESPONSE TO UNDERPAYMENT INEQUITY

JERALD GREENBERG
Ohio State University

A pay cut was theorized to create underpayment inequity among 114 salaried clerical workers. Relative to when their pay was subsequently reinstated, workers cognitively augmented the perceived importance of work environment features as contributors to their overall payment equity. These findings support equity theory's claim that cognitive distortion of outcomes may effectively redress perceived inequities.

Equity theory (e.g., Adams, 1965; Walster, Walster, & Berscheid, 1978) postulates that workers who are inequitably paid—for whom the ratio of rewards (outcomes) to contributions (inputs) is unequal to the corresponding ratio of a comparison other—experience dissatisfaction and will be motivated to alleviate that condition by redressing the inequity. The most commonly studied responses to inequity are behavioral ones, including raising or lowering inputs like job performance and, in extreme cases, quitting a job (Greenberg, 1982, 1987). However, equity theory also acknowledges that people can redress states of inequity cognitively, for instance, by altering their beliefs about the outcomes they receive from their jobs. For example, the theory asserts that workers who are underpaid financially may be able to reestablish overall levels of equity by convincing themselves that they are well compensated with respect to other outcomes. Despite this acknowledgment, research on equity theory has emphasized studying behavioral responses to inequity (for a review, see Mowday, 1987) and thus has revealed little about the cognitive strategies workers use to alter their perceptions of inequitable states.

This state of affairs is an important limitation on our understanding of reactions to inequities in organizations (Greenberg, 1987). Although workers may raise or lower their outcomes in response to inequitable situations, the behaviors usually studied represent relatively extreme reactions. Research has ignored the more subtle and ubiquitous cognitive reactions that are

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likely to occur. For example, although workers may be reluctant to threaten their job security by lowering their inputs or to face chastisement from co-workers by raising their inputs, it may be very simple for them to redress inequity by cognitively redefining a situation (Weick & Nasset, 1968). Indeed, it is a basic proposition of equity theory that people will attempt to redress inequities in the least costly way (Walster et al., 1978: 36). Cognitive redefinition of a situation represents one such strategy.

What little evidence is available on the use of cognitive strategies to resolve inequity has followed from the tradition of research on cognitive dissonance (Festinger, 1957), focusing on people's perceptions of task characteristics. For example, Lawler and O'Gara (1967) and Weick (1964) found that underpaid people evaluated the jobs they were doing as being more interesting than did people who were equitably paid. According to models of self-justification (Deci, 1975; Lepper & Greene, 1978), underpaid workers are motivated to perceive the tasks they perform as highly interesting so as to cognitively justify their performing them in exchange for low wages.

Although findings like these suggest that workers' evaluations of job outcomes may depend on perceptions of outcomes, equity theory is admittedly extremely vague about the relationships among outcomes (Adams & Freedman, 1976). Equity theory treats outcomes as a unitary set although they are often manipulated independently in organizations. For example, the actual level of nonmonetary outcomes, such as job status or working conditions (Greenberg, 1988), often does not change when a company implements a reduction in pay. However, it is likely that the manipulation of monetary outcomes will affect workers' perceptions of outcomes that are not manipulated. Workers facing a pay reduction may seek an opportunity to redress the resulting underpayment inequity by cognitively augmenting the value of other outcomes they receive (Greenberg, 1982). In so doing, they may be effectively reducing the inequity they face in a low-risk manner.

The present investigation examined whether workers evaluated their nonmonetary rewards as higher during a period in which monetary rewards were reduced than they did when monetary rewards were increased to their previously established levels. The nonmonetary outcomes examined in the present study were features of the physical work environment that previous research has shown to have reward value to employees (for a review, see Sundstrom, 1986). For example, opportunities to work in large, private offices or to have large desks have been recognized as valued organizational rewards (Konar, Sundstrom, Brady, Mandel, & Rice, 1982). Moreover, previous research has found such environmental rewards to be salient contributors to payment equity (Greenberg, 1988), which justifies choosing them as outcomes suitable for study as targets of cognitive reevaluation.

If features of a physical work environment have reward value to employees, and if underpaid workers are motivated to redress inequitable conditions by highlighting the value of the environmental rewards they receive, it follows that workers will be more strongly motivated to cognitively augment the reward value of environmental features when they are underpaid

than when they are equitably paid. Specifically, I expected workers to cognitively enhance the value of various nonmonetary, environmental rewards as determinants of their overall fair payment when they were financially underpaid. Such an effect is consistent with research on inadequate justification showing that people cognitively enhance the value of nonmonetary rewards when monetary rewards are reduced (for a review, see Lepper & Greene, 1978).

Hypothesis 1: The perceived importance of environmental features as determinants of overall fair payment will be greater during a period of reduced pay than during a period of reinstated pay.

A related hypothesis may be derived regarding the amount of nonmonetary rewards people believe necessary to establish overall equitable payment. Research has shown that various features of office environments may function as rewards that can create states of equity or inequity (Burt & Sundstrom, 1979; Greenberg, 1988). Thus, it follows that workers will believe that more environmental rewards are necessary to establish overall equitable payment when they are underpaid financially than when they are equitably paid.

Hypothesis 2: The perceived amounts of environmental features required to establish equitable payment will be greater during a period of reduced pay than during a period of reinstated pay.

Finally, it should be noted that equity theory stipulates that inequitably paid workers will experience more job dissatisfaction than those who are equitably paid (Greenberg, 1984). However, if underpaid workers cognitively redefined outcomes as Hypotheses 1 and 2 predict, they would not be expected to experience dissatisfaction. The inequity they perceived would already have been redressed through cognitive reevaluation, and negative attitudinal responses to underpayment would thus be reduced.

Hypothesis 3: Workers' job satisfaction will not differ significantly in a period of reduced pay and a period of reinstated pay.

METHODS

Respondents

The primary participants in the study were 114 salaried white-collar employees (68 men and 46 women) of a nonunionized manufacturing firm located in a large city. Among them were three subgroups representing different occupational classifications, including 34 secretaries, 36 clerical workers, and 44 lower-level managers. Their median age was 28 years, and their median job tenure with the organization was 3.5 years. An additional 18 employees completed the questionnaire initially but were no longer employed by the organization at the time of the second administration.

Procedures

Because a slow sales period prompted a managerial decision to cut all employees' pay by 6 percent, an opportunity presented itself to study reactions to underpayment inequity in a naturalistic setting. Previous research has suggested that the reduction of an established pay level without any concomitant lowering of job responsibilities will lead workers to experience underpayment inequity (Greenberg, 1982). Employees were given no information about the circumstances leading to the pay reduction—although they knew that the company's sales were slow—and were merely told that an across-the-board cut was being implemented to avoid the lay-off of any workers.

Data were collected at two times: 6 months after institution of the pay cut and 14 months later, which was 6 months after the reinstatement of prereduction pay levels. The rationale for allowing workers to experience 6-month intervals at each pay level before administering the questionnaire was that doing so would ensure that their reactions were the result of relatively stable conditions. The 6-month delay also eliminated from the primary sample those who elected to respond to the inequity by leaving their jobs (Finn & Lee, 1972; Telly, French, & Scott, 1971). All participants completed the questionnaire voluntarily during nonwork periods and were assured of the anonymity of their responses. No employee approached by the investigator declined to participate.

The research questionnaire consisted of four parts. The first section contained an item designed as a check on the internal validity of the study—a question to establish that the workers studied felt more underpaid while working under the lower salary conditions that they did after their previous pay level was reinstated. Specifically, respondents were asked, "Financially, how equitably or inequitably paid are you on your job?" Responses were made on a bidirectional scale ranging from 1, greatly underpaid, to 9, greatly overpaid, with the midpoint labeled "equitably paid." Although the psychometric properties of this single-item measure may be suspect, its use was justified on the grounds that previous studies have successfully used similar items (Greenberg & Ornstein, 1983).

The second part of the questionnaire consisted of a series of items asking workers "How important is each of the following features of your work environment as a determinant of your overall fair payment?" Responses could range from 1, not at all important, to 15, extremely important, with the midpoint labeled "moderately important."¹ The features, derived from surveys probing what environmental characteristics are common sources of organizational reward among office workers (Konar et al., 1982; Sundstrom,

¹ For this and for the following question, I anticipated that respondents would use half the scale, the portion from "moderately important" to "extremely important." Thus, 15-point bipolar scales were used to allow ample room for discrimination between responses while not biasing the potential range of responses with a unipolar scale.

1986), were (1) amount of floor space, (2) amount of desk space, (3) amount of privacy, (4) number of co-workers sharing office, (5) amount of personal space, (6) capacity to personalize work environment, (7) number of work surfaces, (8) number of windows in work area, (9) opportunities to select decor and furnishings, and (10) amount of storage room. The ten responses were averaged to form one scale ($\alpha = .93$).

A post-experimental questionnaire verified that each of the ten environmental features constituted a potential source of reward for employees. Two months after the second administration of the questionnaire to the primary respondents, I contacted 38 new employees of the firm. The new employees, who were demographically similar to the study group, had been hired after previous pay levels had been reinstated. Therefore, recollections of the pay reduction could not bias their responses. They were asked to indicate the perceived value as an organizational reward of each of the ten features on a response scale ranging from 1, not at all valuable as a reward, to 9, extremely valuable as a reward, with the midpoint labeled "moderately valuable as a reward." All ten features received very high ratings ($\bar{x} = 7.88$) that did not differ significantly from each other ($F < 1.00$, n.s.), which verified that the features studied constituted potentially valuable sources of reward to the employees. Preexperimental interviews with supervisors from the host firm, who indicated that these features were highly valued rewards in their organization, further supported the selection of the ten features.

The third part of the questionnaire was designed to tap perceptions of the relative amounts of the ten features workers believed they required to be fairly paid. Workers were asked, "Compared to the amount you have now, how much of each of the environmental features below do you believe you should have to be equitably paid?" Scale values ranged from 1, much less, to 15, much more, with the midpoint labeled "same amount."² As with the previous question, I averaged responses to these items to form a single scale ($\alpha = .90$).

The final part of the questionnaire consisted of the 20-item version of the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967). Coefficient alpha was computed to be .89, a figure comparable to other published internal consistency data for this scale (Price & Mueller, 1986).

RESULTS

Exploratory analyses of the data revealed that there were no significant differences between the three subgroups of respondents used in the study on

² Because both preexperimental interviews with supervisors and previous research (Konar et al., 1982) indicated that fewer office mates were more rewarding than more office mates, in contrast with the remaining nine features in which more constituted a greater reward level, I decided a priori to reverse-score the item "number of co-workers sharing office" to maintain consistency in scoring.

any of the dependent measures. Accordingly, all subsequent analyses are based on data from the three groups combined. In addition, to aid interpretation of the results, I computed Pearson product-moment correlations between all pairings of measures taken at both pay periods. Table 1 shows the resulting intercorrelation matrix.

Perceived Payment Equity

The question assessing workers' perceptions of the equity or inequity of their financial payment verified that they felt underpaid while their pay was reduced. Specifically, during the reduced-pay period, the mean response to the payment equity question (2.16) was significantly lower than it was during the reinstated-pay period (4.66, $t_{113} = 20.81$, $p < .001$).

Cognitive Reevaluation Questions

For the question assessing the perceived importance of the various status symbols, a MANOVA revealed significant differences between the responses during the reduced-pay and reinstated-pay periods ($F = 88.63$, $p < .001$). Supporting Hypothesis 1, when they were underpaid financially, workers reported that the environmental rewards were more important determinants of overall fair pay than when they were equitably paid ($\bar{x} = 11.44$ vs. 9.42). In fact, as revealed by the statistically significant correlation of $-.38$ shown in Table 1, the more underpaid workers felt, the more important the environmental features were to them during the reduced-pay period. A nonsignificant correlation of $-.16$ was obtained between the same variables during the reinstated-pay period. These two correlations differed from each other at a marginal level of statistical significance ($z = 1.70$, $p < .09$).

Individual comparisons between the pay periods revealed that workers

TABLE 1
Intercorrelations Between Measures Within and Between Pay Periods^a

Variables	1	2	3	4	5	6	7
Reduced-pay period							
1. Perceived payment equity ^b							
2. Importance of features	-.38***						
3. Amount of features	-.34***	.09					
4. MSQ score	.15	.06	.05				
Reinstated-pay period							
5. Perceived payment equity ^b	-.02	.00	.01	.03			
6. Importance of features	.04	.05	.02	.06	-.16		
7. Amount of features	.01	.07	.02	.04	-.18	.01	
8. MSQ score	.03	.03	.06	.07	.12	.00	-.03

^a Unless otherwise noted, $N = 114$.

^b Interpretation of correlations involving this bidirectional scale was facilitated by decomposing it into two unidirectional scales. However, because 90.35 percent of the responses ranged from 1, greatly underpaid, to 5, the midpoint, equitably paid, I analyzed only one unidirectional scale ($N = 103$).

*** $p < .001$

placed greater importance on eight of the ten environmental features when their pay was reduced than they did when their pay was reinstated. Although the difference between the means for the remaining two environmental features failed to reach significance, they were in the predicted direction. The left side of Table 2 reports the corresponding means and standard deviations and the results of *t*-tests comparing the means.

For the question assessing the perceived amounts of the various environmental features workers believed they required to establish equitable payment, a MANOVA revealed significant differences between the responses during the reduced-pay and reinstated-pay periods ($F = 64.02$, $p < .001$). Supporting Hypothesis 2, workers believed they required greater amounts of the various environmental rewards to be fairly paid when their pay was reduced than they did when their pay was reinstated ($\bar{x} = 11.14$ vs 9.36). In fact, as revealed by the statistically significant correlation of $-.34$ shown in Table 1, the more underpaid workers felt, the more of the features they reportedly needed to consider themselves fairly paid during the reduced-pay period. A nonsignificant correlation of $-.18$ was obtained between these same variables during the reinstated-pay period. These correlations were not significantly different from each other ($z = 1.13$, n.s.).

Individual comparisons between the pay periods revealed that workers reported requiring greater amounts of nine of the ten environmental features when their pay was reduced than they required when their pay was reinstated. Although the difference between the means for the "decor selection" feature failed to reach significance, it was in the predicted direction. The right side of Table 2 shows the corresponding means and standard deviations and the results of *t*-tests comparing these means.

Job Satisfaction

Analysis of the MSQ scores of workers during the reduced-pay period ($\bar{x} = 66.74$) and the reinstated-pay period ($\bar{x} = 67.81$) revealed a difference that was not statistically significant ($t < 1.00$, n.s.) thereby confirming Hypothesis 3. Moreover, although there was a positive trend in the relationship between satisfaction and perceived financial equity, the correlations between these variables, shown in Table 1, were not significant during either period.

DISCUSSION

The present results highlight the operation of a process that equity theory has posited (Adams, 1965) but that previous research has not directly demonstrated. This process is the cognitive reevaluation of one set of outcomes in response to an inequitable state in another set of outcomes. Specifically, a pay cut, a reduction in monetary outcomes to below established levels, resulted in perceived financial underpayment among workers. Workers had concomitant tendencies (1) to enhance the perceived importance of other outcomes—valued features of the work environment—as contributors

TABLE 2
Means, Standard Deviations, and Comparisons Between Reduced-pay
and Reinstated-pay Periods for Cognitive Reevaluation Questions^a

Environmental Features	Importance of Feature ^b					Number of Features ^c				
	Reduced-pay Period		Reinstated-pay Period		t ^d	Reduced-pay Period		Reinstated-pay Period		t ^d
	Means	s.d.	Means	s.d.		Means	s.d.	Means	s.d.	
Floor space	11.64	3.66	8.14	2.28	9.72***	9.86	4.19	8.71	3.27	2.56**
Desk space	13.01	4.51	9.44	3.34	8.50***	10.75	3.80	9.06	2.12	4.83***
Privacy	11.86	4.56	10.51	2.63	3.46***	12.39	4.57	10.66	3.77	3.68***
Office mates	12.79	3.76	10.77	2.91	4.70***	11.67	4.20	9.45	2.88	5.69***
Personal space	12.19	4.20	9.65	4.36	4.79***	10.95	3.61	9.64	4.73	2.67***
Personalization	10.86	3.26	8.46	2.21	7.06***	12.48	4.39	9.81	2.69	5.93***
Work surfaces	8.54	4.55	7.98	3.42	1.08	9.61	3.74	8.59	3.90	2.17*
Windows	12.67	4.81	10.44	4.08	4.13***	12.51	4.86	10.42	3.41	3.87***
Decor selection	9.62	3.61	9.04	2.88	1.49	8.50	3.98	7.86	4.15	1.36
Storage room	11.18	4.71	9.81	3.98	2.54**	12.67	2.84	9.41	3.82	8.15***

^a N = 114.

^b Scores could range from 1 to 15, with higher scores reflecting greater perceived importance of the feature as a determinant of overall fair payment.

^c Scores could range from 1 to 15, with higher scores reflecting greater amounts of the feature required to establish equitable payment, with the exception of "office mates," for which the scoring was reversed.

^d df = 113.

* p < .05, one-tailed test

** p < .01, one-tailed test

*** p < .001, one-tailed test

to overall feelings of equitable payment and (2) to exaggerate the perceived level of these outcomes needed to establish equity. Although theorists have suggested that states of inequity reduce job satisfaction (Adams, 1965), in this study levels of job satisfaction were not lower during the period of underpayment. That finding may be taken as evidence that cognitive reevaluation responses effectively minimized the distressing effects of the inequity.

The present results extend earlier findings showing that workers respond to underpayment inequity by enhancing the perceived interest value of work (Lawler & O'Gara, 1967; Weick, 1964). Apparently, an underpayment inequity may also facilitate cognitive enhancement of a work environment. Such cognitive reevaluation responses appear to represent relatively innocuous but effective ways of responding to an inequitable state, precisely the kind of responses that equity theory proposes as desired mechanisms of inequity reduction (Walster et al., 1978: 36). Specifically, workers may prefer to redress inequities by cognitively reevaluating outcomes than by engaging in the potentially riskier behavioral inequity-resolution tactic of lowering their performance—especially when the latter may jeopardize their job security, as it would in a period of economic downturn like the period studied here (Brockner & Greenberg, 1989). However, because data were not available concerning workers' job performance, the present study does not provide insight into how workers may have used the cognitive inequity-resolution strategies noted in conjunction with behavioral strategies. Accordingly, the generalizability of the present results needs to be assessed in future research examining the relationships between multiple inequity-resolution strategies (Adams & Freedman, 1976).

In this regard, the reader is cautioned that the focus on the cognitive reevaluation of environmental outcomes in the present study is not meant to imply that these are the only outcomes likely to be sensitive to the cognitive reevaluation process evidenced here. It would be premature to assume that these outcome variables have any special theoretical status other than the fact that their selection for study made them salient to the participants. Accordingly, future research is needed to examine the conditions underlying workers' choice of an outcome variable (or set of variables) as the target of their cognitive-enhancement efforts.

The generalizability of the process tapped in the present study is also limited by the fact that self-comparisons appear to have been the referents used as the basis for making judgments about payment equity. Self-referents were salient in this study because all others in the same organization encountered an equivalent-percentage pay cut. Thus, workers used themselves at an earlier time as referents (Austin, 1977). Although previous field research has found self-comparisons to be salient sources of inequity (e.g., Lord & Hohenfeld, 1979), it is possible that inequities prompted by comparisons to other referents would have triggered different reactions from those I observed (Goodman, 1974; Scholl, Cooper, & McKenna, 1987).

Finally, the fact that only reactions to underpayment inequities were

studied also limits the present findings. To test the symmetry of the phenomenon observed here, future research is needed that also examines workers' cognitive reactions to overpayment inequities. Since previous research has shown that the threshold for overpayment inequity is higher than that for underpayment inequity (Zedeck & Smith, 1968), there is reason to be cautious about premature generalization of the present results in the opposite direction.

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Jerald Greenberg earned his Ph.D. degree in industrial-organizational psychology at Wayne State University. He is an associate professor in the Faculty of Management and Human Resources at the Ohio State University. His current research focuses on the role of distributive and procedural justice in organizational behavior.

WORK AND FAMILY VARIABLES AS MEDIATORS OF THE RELATIONSHIP BETWEEN WIVES' EMPLOYMENT AND HUSBANDS' WELL-BEING

SAROJ PARASURAMAN
JEFFREY H. GREENHAUS

Drexel University

SAMUEL RABINOWITZ

Rutgers University

ARTHUR G. BEDEIAN

Louisiana State University

KEVIN W. MOSSHOLDER

Auburn University

This study found that husbands of employed women reported slightly lower levels of job satisfaction, marital adjustment, and quality of life than husbands of housewives. Husbands' time commitment to work and satisfaction with childcare were found to mediate the effect of wives' employment on husbands' job satisfaction and marital adjustment, respectively.

The continued increase in the rate of married women's participation in the labor force, which reached 56 percent in 1987 (U.S. Department of Labor, 1987), has stimulated growing research interest in the effect of wives' employment status on both their own and their husbands' well-being. Although there is substantial evidence that employment outside the home tends to enhance the psychological well-being of women (Kessler & McRae, 1982; Warr & Parry, 1982), the consequences of such employment for their husbands' well-being is less clear. Concern about this issue derives from a wider research interest in relationships between work and family roles (Kanter, 1977; Nieva, 1984) and in growth of the dual-earner life-style in contemporary society. Investigating such issues brings into sharper focus the intrusiveness of work into family life and the effect of family life on job experiences (Moen, 1985; Rapoport & Rapoport, 1971). Thus, the purpose of this study was to (1) investigate the relationships between women's employment and multiple indicators of husbands' well-being pertaining to work, family, and overall quality of life and (2) identify the mediating variables or underlying mechanisms that explain observed relationships.

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Prior research in this area has been both provocative and inconclusive. Several studies have found small but significant negative effects of women's employment on their husbands' well-being. For example, husbands of employed women have been reported to experience more job pressure (Burke & Weir, 1976), higher levels of depression (Kessler & McRae, 1982; Rosenfield, 1980), lower self-esteem (Kessler & McRae, 1982), greater marital instability (Booth, Johnson, White, & Edwards, 1984), lower marital satisfaction (Burke & Weir, 1976), lower job satisfaction (Burke & Weir, 1976; Staines, Pottick, & Fudge, 1985, 1986), and lower life satisfaction (Burke & Weir, 1976; Staines et al., 1986) than husbands of housewives. These studies have clearly indicated that both the work and family domains are permeable and that experiences in one domain affect the other (Greenhaus & Parasuraman, 1986).

However, other researchers have found no differences in levels of psychological depression (Roberts & O'Keefe, 1981), marital adjustment and marital satisfaction (Glenn & Weaver, 1978; Locksley, 1980; Staines, Pleck, Shepard, & O'Connor, 1978), or overall happiness (Benin & Nienstedt, 1985) between men married to employed women and those married to housewives. Moreover, although Booth (1977) found wives' employment to have generally nonsignificant effects on the marital discord and stress reported by their husbands, the few significant effects observed indicated that husbands of employed women tended to enjoy happier marriages, were less likely to have infectious diseases, and had lower levels of psychiatric impairment than husbands of housewives.

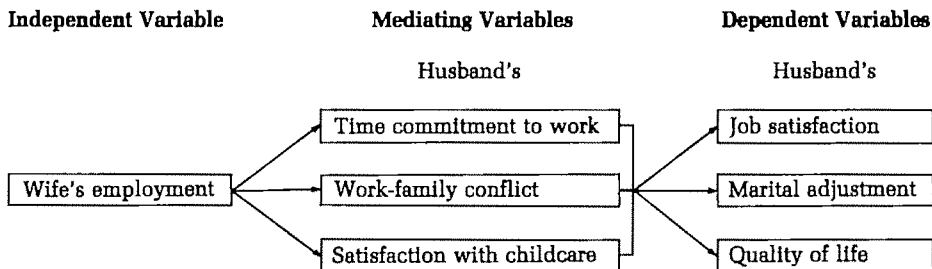
Staines and colleagues (1986) examined several potential mediators of the relationship between a wife's employment status and her husband's well-being. Although the results did not support the study's hypotheses that husbands' additional domestic burdens, negative attitudes toward wives' employment status, and restricted career mobility would have mediating roles, the researchers did find that the husbands of employed women felt less adequate as breadwinners than the husbands of housewives and that this feeling of inadequacy as a breadwinner mediated a negative relationship between a woman's employment and her husband's well-being. These disparate and sometimes conflicting findings of previous studies emphasize the need for new research reexamining the relationship between a woman's employment and her husband's well-being and clarifying the role of salient mediating variables that serve to explain the nature of the relationship.

SCOPE OF THE CURRENT STUDY

Figure 1 presents a conceptual model of the variables in this study and the hypothesized pattern of relationships among them. As indicated in the model, a wife's employment status is expected to be related to three dimensions of her husband's well-being, respectively representing his affective reactions to the domains of work, family, and personal life: job satisfaction; marital adjustment, or the degree of happiness of the husband in his marriage; and overall quality of life.

On the basis of prior research (Staines et al., 1986) suggesting that the

FIGURE 1
Conceptual Model of the Relationship Between Wives' Employment
and Husbands' Well-being



effect of wives' employment on husbands' well-being is indirect, the model posits that a husband's time commitment to work, work-family conflict, and satisfaction with childcare will mediate the relationships of a wife's employment with his job satisfaction, marital adjustment, and quality of life. According to James and Brett (1984), a mediator effect is present if all the influence of an antecedent variable *x* (in this study, wife's employment) on a consequent variable *y* (husband's well-being) is transmitted through a third variable *m*, the mediating variable. In terms of the variables examined in this study, we expected that the relationship between a wife's employment and her husband's well-being would disappear when any one of the three potential mediating variables was held constant. The rationale for the inclusion of each mediator in the model follows.

Regarding time commitment to work, we expected that the husbands of employed women would devote less time to their work and that this would detract from their feelings of well-being in the work and nonwork domains. Recent studies (Barnett & Baruch, 1987; Pleck, 1979, 1985) have shown that husbands in dual-earner families spend more hours per week engaged in housework and in childcare than do husbands of nonemployed women. One consequence of this increased participation in domestic activities by husbands of working wives may be that they become less involved in their jobs than are the husbands of housewives (Gould & Werbel, 1983), in turn receive fewer job-related rewards, and thereby experience decreased job satisfaction and develop more negative attitudes toward other life domains, including marriage and the overall quality of life (Lewis & Cooper, 1987).

It was also expected that work-family conflict would mediate the relationship between wives' employment and the three indicators of husbands' well-being. Work-family conflict refers to role demands in the work domain that conflict with simultaneous role demands in the family domain (Greenhaus & Beutell, 1985). The additional family-role activities required of men in dual-earner relationships are likely to produce high levels of work-family conflict for husbands as they attempt to manage simultaneous work- and family-domain pressures. Moreover, work-family conflict has been associated with decreased marital functioning (Barling, 1986) and with low levels

of job, family, and overall life satisfaction (Pleck, Staines, & Lang, 1980; Staines & O'Connor, 1980). Therefore, a wife's employment was expected to heighten the intensity of work-family conflict experienced by the husband and through that to have adverse effects on his job satisfaction, marital adjustment, and quality of life.

Finally, considering satisfaction with childcare, Benin and Nienstedt (1985) found that husbands in dual-career families with no children or with grown-up children (18 and older) reported greater happiness than did husbands of working wives with preschool and school-age children. This raises the possibility that arrangements for the care of preschool and school-age children may be a salient factor influencing a husband's reactions to his wife's employment. Pleck, Staines, and Lang (1978) identified childcare-related dilemmas as a major source of pressure on the employed parents of young children. Thus, the specific arrangements for childcare (Lewis & Cooper, 1987), the quality of such care (Bryson, Bryson, & Johnson, 1978), and the husband's satisfaction with these arrangements may mediate the relationship of a wife's employment with indicators of her husband's well-being. We expected that the husbands of employed wives with young children would experience more dissatisfaction with childcare arrangements than would husbands of nonemployed women, and that dissatisfaction with childcare would be associated with decreased satisfaction on the job, lower marital adjustment, and lower quality of life. This prediction was based on the assumption that stresses and dissatisfaction within the family role may not only affect marital adjustment and the quality of life (Burke & Weir, 1976; Greenhaus & Parasuraman, 1986; Lewis & Cooper, 1987), but also intrude into the work domain (Crouter, 1984) and affect work-related attitudes (Lewis & Cooper, 1987).

In summary, three indicators of well-being—job satisfaction, marital adjustment, and quality of life—were compared for husbands of housewives and husbands of employed women. To the extent that a woman's employment was related to her husband's well-being, three variables—husband's time commitment to work, work-family conflict, and satisfaction with childcare—were examined as possible mediators of this relationship.

METHODS

Sample

The sample for this study was drawn from a data set of 1,080 accountants randomly chosen from the membership lists of the Association of Government Accountants, the American Society of Certified Public Accountants, the National Association of Accountants, and the American Association of Women Accountants (Greenhaus, Bedeian, & Mossholder, 1987; Mossholder, Bedeian, Touliatos, & Barkman, 1985). The participation rate of individuals chosen for the overall data set was 63 percent. Inclusion in the present set ($N = 413$) was restricted to men who were employed full-time and married at the time the data were collected. Roughly half the men were industrial accountants, and the rest were certified public accountants or

government accountants. Approximately 75 percent of the accountants earned annual salaries of between \$20,000 and \$49,999. Eighty percent of the respondents were between the ages of 30 and 59, and the modal age category ($N = 178$) was 30–39 years. Average levels of job tenure and organizational tenure were approximately two and six years respectively. Nearly 94 percent of the respondents held college degrees and 41 percent of the wives were college graduates.

Measures

Wife's employment status was assessed from responses to an open-ended question regarding spouse employment. The data showed that the wives of 214 respondents were employed at the time of the study and the wives of 199 were not employed. A dichotomous variable was created in which husbands of employed wives were coded 2 and husbands of nonemployed wives were coded 1.

Overall job satisfaction was measured by the short form of the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967). Responses to the 20 items were averaged to produce a total job satisfaction score ($\alpha = .91$).

Marital adjustment was assessed by Locke and Wallace's (1959) Marital Adjustment Scale, which taps the degree of happiness within a marriage; agreement or disagreement between spouses on such matters as finances, demonstration of affection, and philosophy of life; mutuality in resolving disagreements; and commonality of spouses' interests. Responses to the 15 items were averaged so that high scores reflected high levels of marital adjustment and low scores reflected the presence of extensive marital problems ($\alpha = .76$). The scale has been cited as the most widely used and validated measure of marital quality (L'Abate & Goodrich, 1980).

Quality of life was assessed with a scale used by Staines and colleagues (1986) and derived from Quinn and Shepard's (1974) Quality of Employment Survey. In the first portion of the scale, respondents rated their present life situation on eight 7-point bipolar scales (e.g., boring-interesting, lonely-friendly, empty-full). Following previous usage (Greenhaus et al., 1987), we averaged and standardized the seven items. Responses to two other items measuring happiness ("Taking all things together, how would you say things are these days? Not too happy, pretty happy, very happy"), and life satisfaction ("In general, how satisfying do you find the ways you are spending your life these days? Not very satisfying, pretty satisfying, completely satisfying") were also averaged and standardized. We then averaged the two component standard scores to produce an overall quality of life index ($\alpha = .93$).

Time commitment to work was determined from individuals' responses to two items asking them to indicate their employment status (part-time or full-time) and, on the average, how many hours a week they worked on their current job. We excluded respondents who reported working part-time from this study and combined and coded the response options for hours worked by full-time accountants to create four categories of approximately equal

intervals: 30–40 hours, 41–48 hours, 49–59 hours, and 60 hours or more. The modal response category was 41–48 hours per week ($N = 200$).

Work-family conflict was measured by eight items adapted from Burke, Weir, and Duwors's (1979) scale assessing the impact of job on homelife. The eight items measured the perceived effects of current job demands on mental and physical states at home, participation in home activities, vacation, and social activities, and the respondent's relationship with his spouse. Responses to the 5-point items were reverse-scored and averaged ($\alpha = .92$) so that high scores reflected a negative impact of job on homelife (work-family conflict), and low scores reflected a positive impact of job on homelife.

To assess satisfaction with childcare, we asked respondents with young children at home ($N = 221$) to identify childcare arrangements; the options specified ranged from in-home care by self or spouse through care in a day-care center to self-care by the child. They were also asked to indicate their satisfaction with the arrangements on a 4-point scale ranging from 1, very dissatisfied, to 4, very satisfied.

Finally, demographic variables were assessed. Recent studies (Fendrich, 1984; Staines et al., 1985, 1986) have pointed to the importance of controlling for the effects of potentially confounding demographic variables in assessing the relationship between wives' employment and husbands' well-being. We selected five demographic variables suggested in prior research as salient controls: husband's age, education, and salary (Staines et al., 1986), wife's education (Duncan, 1979), and number of children in a family (Bryson et al., 1978; Fendrich, 1984).

Husband's age included five levels ranging from 20–29 years to above 59 years. Both husband's and wife's education were categorized into eight levels ranging from not having completed high school to attainment of a doctoral degree. Husband's salary consisted of six levels, from \$10,000–19,999 to over \$59,999. Number of children was measured by an item asking respondents to indicate the number and ages of their children.

Data Analysis

Following the procedure used by Staines and colleagues (1986), we performed multiple regression analysis to examine the relationship between wife's employment and husband's well-being. In the first step, each indicator of husband's well-being was regressed on wife's employment status to establish the presence or absence of an association between the independent and dependent variables. In the second step, husband's well-being was regressed on wife's employment, and on the five demographic variables (husband's age, husband's education, wife's education, husband's salary, and number of children). If the relationship between wife's employment and husband's well-being was substantially similar after the inclusion of demographic controls, the relationship could not be attributed to the demographic characteristics of the sample. In the third step, husband's well-being was regressed on wife's employment, the five demographic controls, and one of the proposed mediators: time commitment to work, work-family conflict, or

satisfaction with childcare. If the relationship between wife's employment and husband's well-being was substantially reduced by the addition of any one of the three hypothesized mediators, we assumed that the variable played a mediating role. The step-by-step inclusion of the demographic controls and the mediator variables facilitated a clear assessment of which particular variables mediated the relationship observed between wife's employment and the three indicators of husband's well-being.

RESULTS

Table 1 presents the correlations among the study variables. Note that wife's employment was significantly related to husband's job satisfaction and quality of life. Subsequent *t*-tests revealed that job satisfaction was significantly lower ($t = 2.58, p < .01$) among husbands of employed women ($\bar{x} = 3.29, s.d. = .65$) than among husbands of nonemployed women ($\bar{x} = 3.45, s.d. = .58$). In a similar vein, quality of life was lower ($t = 2.70, p < .01$) for husbands of employed women ($\bar{x} = -.10, s.d. = .90$) than for husbands of nonemployed women ($\bar{x} = .14, s.d. = .88$). The significant correlations among quality of life, job satisfaction, and marital adjustment show that the three indicators of husbands' well-being are moderately inter-related (median $r = .41$).

Table 2 presents the results of the regression analyses predicting husbands' job satisfaction. Wife's employment had a significant effect both prior to ($\beta = -.13, p < .01$) and after ($\beta = -.10, p < .05$) the inclusion of the demographic control variables. The effect of wife's employment was reduced to nonsignificance following the inclusion of time commitment to work. The inclusion of work-family conflict also reduced the effect of wife's employment on husband's job satisfaction to nonsignificance. An inspection of Table 1 reveals that time commitment to work was the only mediating variable that was significantly related to both wife's employment ($r = -.10, p < .05$) and husband's job satisfaction ($r = .29, p < .001$). Further inspection of the data shows that husbands of employed women reported working fewer hours per week than husbands of housewives ($\bar{x} = 1.91$ vs. $2.06, t = 1.94, p = .053$). Thus, it appears that a reduction in husbands' time commitment to work provides a partial explanation for the negative relationship between wives' employment and husbands' job satisfaction. Although work-family conflict was unrelated to wife's employment, it had a negative effect on job satisfaction ($\beta = -.30, p < .001$).

Because the childcare satisfaction variable was available only for the 221 respondents with young children, we conducted a separate regression analysis to test for the mediating effect of this variable on the relationship between wife's employment and husband's job satisfaction. Columns 5, 6, and 7 of Table 2 report this analysis. The results show that for the subgroup of the sample with young children, wife's employment had a nonsignificant effect on husband's job satisfaction both before and after the inclusion of demographic controls and after the inclusion of childcare satisfaction in the regression equation.

TABLE 1
Intercorrelations Among Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7
Independent variable									
1. Wife's employment ^b	1.52	0.50							
Dependent variables									
2. Job satisfaction	3.38	0.62	-.13						
3. Marital adjustment	7.27	1.67	-.08	.14					
4. Quality of life	0.03	0.90	-.13	.52	.41				
Mediating variables									
5. Time commitment to work	1.98	0.81	-.10	.29	-.06	.06			
6. Work-family conflict	2.86	0.80	.05	-.30	-.33	-.46	.21		
7. Satisfaction with childcare	3.66	0.56	-.52	.10	.17	.11	-.02	-.02	

^a $n = 413$ for all variables except satisfaction with childcare ($n = 221$). For variables with $n = 413$, r 's of magnitude .10 and above are significant at the .05 level or better; for variables with $n = 221$, r 's of .12 and above are significant at the .05 level or better.

^b Wife not employed = 1, wife employed = 2.

TABLE 2
Results of Regression Analyses Predicting Husbands' Job Satisfaction^a

Variables	All Respondents			Respondents with Young Children			
	Before Controls 1	After Controls 2	After Controls and Mediating Variables		Before Controls 5	After Controls 6	After Controls and Mediating Variable 7
			Time Commitment to Work 3	Work-Family Conflict 4			
Independent variable							
Wife's employment ^b	-.13**	-.10*	-.09	-.09	-.12	-.07	-.04
Control variables							
Husband's age		.07	.08	.03		.02	-.02
Husband's education		-.08	-.07	-.07		.08	-.08
Wife's education		-.01	-.01	-.02		.00	
Number of children		-.11*	-.08	-.12*		.01	.06
Husband's salary		.25***	.17***	.26***		.38***	.38***
Mediating variables							
Time commitment to work			-.25***	-.30***			
Work-family conflict							
Satisfaction with childcare		.09***	.15***	.18***	.01	.15**	.15***
R ²	.02**						
df	1,401	6,396	7,395	7,395	1,220	6,215	7,214

^a Cell entries are standardized regression coefficients. Results reported in columns 5, 6, and 7 pertain to respondents ($n = 221$) with young children.

^b Wife not employed = 1, wife employed = 2.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 3 presents the results of the regression analyses predicting husbands' marital adjustment. The data show that the initially nonsignificant relationship between wife's employment and husband's marital adjustment ($\beta = -.08$) became significant with the inclusion of the demographic controls ($\beta = -.12, p < .05$) and remained significant after time commitment to work was included ($\beta = -.13, p < .01$). The effect of wife's employment on husband's marital adjustment remained significant also when work-family conflict ($\beta = -.11, p < .05$) was included as a mediator. Columns 5, 6, and 7 of Table 3 show the results of the regression analysis for the restricted sample of men with young children. Although the multivariate F for the regression equation as a whole only approached significance ($p = .10$), the effect of wife's employment on husband's marital adjustment after controlling for the demographic variables ($\beta = -.13, p < .10$) dropped to nonsignificance when satisfaction with childcare was included as a mediator. Husbands of employed women were less satisfied with childcare arrangements than were husbands of housewives ($\bar{x} = 3.29$ vs. $3.89, t = 9.10, p < .001$). The strong negative correlation between wife's employment and husband's satisfaction with childcare ($r = -.52, p < .001$) and the positive relationship between childcare satisfaction and marital adjustment ($r = .17, p < .01$) provide some evidence for the mediating role of childcare satisfaction in the prediction of husbands' marital adjustment.

Table 4 reports the regression results predicting husband's overall quality of life. The effect of wife's employment was initially significant ($\beta = -.14, p < .01$) and remained significant after the inclusion of the demographic controls, as well as when time commitment to work and work-family conflict were respectively included as mediators. Columns 5, 6, and 7 of Table 4 report the results of the regression analysis examining the potential mediating effect of satisfaction with childcare on the quality of life for the subsample of married men with young children at home. The data show that wife's employment was unrelated to husband's quality of life both before and after the addition of the demographic control variables and childcare satisfaction. Therefore, none of the proposed mediators explained the relationship between wife's employment and husband's quality of life.

DISCUSSION

The results of this study confirmed previous findings concerning the effects of wives' employment on husbands' well-being. Small but significant negative relationships were observed between women's employment status and two indicators of their husbands' well-being, job satisfaction and overall quality of life. The persistence of these relationships across different professional groups, including engineers and accountants (Burke & Weir, 1976) and public and private accountants (the present study), as well as across different occupations and jobs represented in national employee samples (Kessler & McRae, 1982; Staines et al., 1985, 1986), highlights the potential for wives' employment to have adverse effects on husbands' well-being.

TABLE 3
Results of Regression Analyses Predicting Husbands' Marital Adjustment^a

Variables	All Respondents			Respondents with Young Children		
	After Controls and Mediating Variables			After Controls and Mediating Variable		
	Before Controls 1	After Controls 2	Time Commitment to Work 3	Work-Family Conflict 4	Before Controls 5	After Controls 6
Independent variable						
Wife's employment ^b	-.08	-.12*	-.13*	-.11*	-.11	-.13†
Control variables						
Husband's age		.12*	.11*	.07		.04
Husband's education		.07	.06	.07		.05
Wife's education		.13*	.13*	.11*		.17*
Number of children		-.05	-.05	-.06		.06
Husband's salary		-.09	-.08	-.08		-.05
Mediating variables						
Time commitment to work			-.05			
Work-family conflict				-.32***		
Satisfaction with childcare						
R ²	.01	.04*	.04*	.14***	.04†	.05
df	1,401	6,396	7,395	7,395	1,220	6,215
						7,214

^a Cell entries are standardized regression coefficients. Results reported in Columns 5, 6, and 7 pertain to respondents (n = 221) with young children.

^b Wife not employed = 1, wife employed = 2.

† p < .10

* p < .05

** p < .01

*** p < .001

TABLE 4
Results of Regression Analyses Predicting Husbands' Quality of Life^a

Variables	All Respondents			Respondents with Young Children		
	Before Controls 1	After Controls 2	After Controls and Mediating Variables		Before Controls 5	After Controls 6
			Time Commitment to Work 3	Work-Family Conflict 4		
Independent variable						
Wife's employment ^b	-.14**	-.13*	-.13*	-.11*	-.10	-.08
Control variables						
Husband's age		.06	.06	-.01		-.02
Husband's education		-.03	-.03	-.02		-.02
Wife's education		.03	.03	.00		.06
Number of children		-.02	-.02	-.04		.12
Husband's salary		.07	.06	.09		.11
Mediating variables						
Time commitment to work			.03			
Work-family conflict				-.48***		
Satisfaction with childcare	.02**	.03	.03	.25***	.01	.06
R ²	1,401	6,396	7,395	7,395	1,220	6,215
df						

^a Cell entries are standardized regression coefficients. Results reported in Columns 5, 6, and 7 pertain to respondents ($n = 221$) with young children.

^b Wife not employed = 1, wife employed = 2.

* $p < .05$

** $p < .01$

*** $p < .001$

However, the overall effect of wife's employment on husband's well-being observed in this study was small, explaining 2 percent or less of the variance in the three dependent variables. Wife's employment status has accounted for similarly low percentages of variance in measures of husband's well-being in previous studies (Staines et al., 1985, 1986). These results suggest that other, unmeasured, variables (James, Mulaik, & Brett, 1982) not included in this study may provide additional explanation of variation in husbands' well-being.

In previous studies and in the present research, the negative relationships between wives' employment and indicators of husbands' well-being could not be attributed solely to the influence of demographic characteristics on the independent and dependent variables. Moreover, although wife's employment had no negative effect on husband's marital adjustment by itself, the emergence of a significant relationship subsequent to the introduction of demographic controls reinforced the importance of including salient demographic covariates in assessing relationships of wives' employment with measures of husbands' well-being.

The expectation that selected work and family variables would mediate the relationship between wives' employment and husbands' well-being was partially supported. The negative relationship between wife's employment and husband's job satisfaction seemed attributable to a reduction in husband's time commitment to work. The husbands of employed women tended to work fewer hours per week than the husbands of housewives; this lower time commitment to work was accompanied by lower levels of job satisfaction, possibly due to fewer job-related rewards. These results indicate how a family-related variable like spouse's employment can affect behavior in the work domain and suggest that time commitment to work may be considered, along with adequacy as a breadwinner (Staines et al., 1986), as a mediator of relationships between wives' employment and husband's job satisfaction.

The results regarding the mediating role of satisfaction with childcare on marital adjustment should be interpreted cautiously, since they only approached significance. However, the data provide tentative evidence that dissatisfaction with childcare arrangements mediates the relationship between wives' employment and husbands' marital adjustment for families with young children. Wife's employment was negatively related to husband's satisfaction with childcare, which in turn was positively related to marital adjustment. Viewed in terms of the life stage in husbands' well-being (Benin & Nienstedt, 1985), this finding suggests that not merely the number of children in a family but also the satisfactoriness of childcare arrangements affect marital adjustment. Further research is needed, however, before any firm conclusions can be drawn about the mediating role played by this variable.

Although work-family conflict did not emerge as a significant mediator, it was negatively related to husband's job satisfaction, marital adjustment, and quality of life, findings that are highly consistent with prior research (Kopelman, Greenhaus, & Connolly, 1983; Sekaran, 1985). The failure to

serve as a mediator appears to be due to the absence of a relationship between wife's employment and work-family conflict. This unexpected finding suggests that other family variables, such as the division of domestic labor within a household, may moderate the relationship between a wife's employment and the level of work-family conflict experienced by her husband, a topic worthy of further study.

The present study demonstrates the complex interrelationships between spouses' work and nonwork roles in dual-earner relationships (Greenhaus, 1987; Sekaran, 1986). The findings represent an extension of previous studies that have emphasized the intrusiveness of family situation variables on women's work attitudes and behavior. Although the magnitude of the negative relationships found between wives' employment and indicators of husbands' well-being was modest, the present results emphasize the need for husbands to understand the effects of their wives' employment on their own lives so they can make career decisions that meet both spouses' needs. Similarly, the data suggest that women must understand the impact, if any, of their own work behavior on their husbands' careers and lives. In short, the pursuit of parallel work and family roles by spouses in dual-earner relationships requires mutual understanding of the implications of this life-style for their well-being in both work and nonwork domains (Gilbert, 1985; Greenhaus, 1987).

Although this study provides interesting new insights into the effects of women's labor force participation on dimensions of their spouses' well-being, additional research is required to map more completely the contingencies affecting the strength and pattern of relationships. For example, in the present study, it was impossible to determine whether a woman was employed part-time or full-time. Although previous studies have found wives' employment to have deleterious effects on husbands' well-being when wives were employed 20 hours or more (Staines et al., 1986), when wives were employed full-time and part-time (Burke & Weir, 1976), and when the number of hours worked by wives was not specified (Kessler & McRae, 1983; Rosenfield, 1980), a direct examination of the effect of women's employment status (part-time versus full-time) is necessary to clarify this issue. Moreover, since a woman's salary can increase the family's standard of living and can shift the distribution of power between spouses (Sekaran, 1986), future research should also assess the effect of the level of wives' income on husbands' well-being.

In this context, it is also necessary to assess whether the salience of the work role or the type of job held by a woman (e.g., managerial versus clerical or blue-collar, or professional versus technical) affect the strength of the relationship between her employment status and her husband's well-being. To the extent that wives are intensely involved in their careers, they may have less time available for expressive interaction with their husbands (Burgess, 1981), and the reduction in emotional support provided may decrease well-being among husbands. This is an area that deserves investigation. Finally, the need for longitudinal research should not be surprising. Al-

though causal relationships between wives' employment and husbands' well-being have been implied, the possibility of reverse or reciprocal causation cannot be ruled out. For example, it is possible that some women resort to outside employment as a means of relief from a dissatisfying marriage or a husband frustrated with his job. Nevertheless, the identification of patterns of relationships between wives' employment and husbands' well-being, as in the present study, is a necessary first step in the development and refinement of a causal theory.

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Saroj Parasuraman received her Ph.D. degree in organizational behavior from the State University of New York at Buffalo and is currently associate professor of management at Drexel University. Her research interests encompass stress and coping, work-family linkages, work attitudes and turnover, and career development of minorities.

Jeffrey H. Greenhaus, a professor of management at Drexel University, received his Ph.D. degree in industrial-organizational psychology from New York University. His current research interests include career management, work-family dynamics, and the career experiences of women and minorities.

Samuel Rabinowitz earned his Ph.D. degree at Michigan State University. He is currently an associate professor at the School of Business, Rutgers—The State University of New Jersey, Camden. His research interests include job involvement and issues surrounding career and life stages both within and outside of the workplace.

Arthur G. Bedeian is the Ralph and Kacoo Olinde Distinguished Professor of Management at Louisiana State University, Baton Rouge. His research interests include organization design, behavior in organizations, and role strain.

Kevin W. Mossholder is an E. L. Lowder Professor of Management, Department of Management, Auburn University. He has a Ph.D. degree in industrial-organizational psychology from the University of Tennessee at Knoxville. His current research interests include turnover phenomena, attitude-behavior interfaces, and research methods issues.

INTERORGANIZATIONAL DEPENDENCE AND CONTROL AS PREDICTORS OF OPPORTUNISM IN DEALER-SUPPLIER RELATIONS

KEITH G. PROVAN
STEVEN J. SKINNER
University of Kentucky

This study examines Williamson's (1975) concept of opportunism in relations between farm and power equipment dealers and their primary supplier organization. Results from a national survey generally support hypotheses predicting that dealer opportunism will be negatively related to dealer dependence on a primary supplier and positively related to supplier control over dealer decisions.

One of the more recent ways of thinking and theorizing about relations between organizations is Williamson's markets and hierarchies perspective (Williamson, 1975; Williamson & Ouchi, 1981). Williamson's basic view is that economic activity will be more efficient—transaction costs will be lower—when it is conducted within a single organization, or hierarchy, rather than through a market of several organizations. Williamson specifically posited that in economic relationships among organizations, four conditions that characterize most interorganizational exchanges give rise to transaction costs: uncertainty about or the complexity of future environmental states, bounded rationality, small numbers bargaining, and opportunism. Uncertainty and the bounded rationality of decision makers combine to create situations in which contracts based on transactions between two organizations cannot specify all possible contingencies. In addition, most markets are characterized by relatively small numbers of possible transaction partners, some of which behave opportunistically, or in ways that involve “making false or empty, that is, self-disbelieved, threats and promises in the expectation that individual advantage will thereby be realized” (Williamson, 1975: 26). Other firms cannot easily avoid opportunistic organizations because of the small numbers condition. When the transaction costs that result from the occurrence of these two pairs of relationships become sufficiently high, Williamson proposed that organizations seek to reduce costs by shifting from market, or interorganizational, exchanges to exchanges within a single hierarchy in which opportunism can be more readily controlled.

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Despite the importance of all four conditions for explaining economic interorganizational exchanges, theory development and research on all four have not been equal. Williamson, an economist, focused primarily on the small numbers problem. Although there has been little direct empirical study of bounded rationality, the concept has been a major force underlying the development of behavioral views of decision making (Cyert & March, 1963). Organizational theorists have studied the issue of environmental uncertainty and complexity in considerable depth. However, despite the theoretical importance of opportunism for explaining interorganizational relations, researchers have devoted very little attention to the subject (Maitland, Bryson, and Van de Ven, 1985 is an exception), and empirical research is virtually nonexistent in the organizational literature.

The study reported here addressed this shortcoming by examining the extent to which farm and power equipment dealers are likely to engage in opportunistic behavior in relations with their primary supplier organizations. We propose that such behavior is a function of dealers' dependence on suppliers and the extent to which suppliers attempt to control dealers' decisions.

Farm and power equipment dealers were selected for this study because they were a set of firms in a single industry that were legally distinct entities but typically dependent on a primary supplier organization for many of their business needs. Thus, all dealers studied could readily respond to questions regarding relations with a single type of organization that was important to all. Furthermore, the economic recession in the farm industry during the time of data collection and the tensions resulting from this resource scarcity meant that opportunistic behavior by dealers would not be unanticipated, providing a good context for testing our hypotheses.

OPPORTUNISM AND POWER

Opportunism, in this context, is behavior by economic agents that involves "self-interest-seeking with guile" (Williamson, 1975: 26). Williamson emphasized that in relations among organizations, such behaviors as hard bargaining or intense disagreement are not opportunistic, nor are advantages that may result from having a unique location or skill the result of opportunism. Rather, for an organizational advantage to be considered a result of opportunism, "the strategic manipulation of information or misrepresentation of intentions" (Williamson, 1975: 26) must have occurred. Activities like taking shortcuts, breaking promises, masking inadequate or poor quality work, and generally being dishonest in order to gain an advantage are examples. The emergence of opportunism is less probable in hierarchical relationships within an organization than it is in relations between organizations, given the strong social constraints against deceit and deception that generally exist among people who work together and the potential for internal sanctions. Indeed, the possibility of controlling opportunistic behavior,

thereby reducing transaction costs, is a major reason organizations move from markets to hierarchies (Williamson & Ouchi, 1981). At the interorganizational level, however, opportunism is not readily monitored and sanctions are infrequent. Thus, although most individuals would view opportunism as unethical, it does occur in relations among organizations. For instance, some packers in the meat industry have been known to mix inferior grades and cuts of beef with their regular beef shipments to restaurant suppliers as a way of cutting costs and increasing profits. Although the incidence of such behavior will probably be low when relations among organizations are long-term because of the expectation of repeat business, Williamson argued that the level of trust in business is such that firms will always anticipate some opportunistic behavior.

Because opportunism involves gaining an advantage relative to other organizations, it may be thought of as related to power. By engaging in opportunistic behavior, an organization can influence the decisions of other organizations in ways that favor its own needs. In fact, the willingness to behave opportunistically may allow an organization to influence other organizations, at least in the short run, to an extent that is well beyond what might have been expected from an examination of its traditional bases of power (Astley & Sachdeva, 1984; French & Raven, 1959; Hickson, Hinnings, Lee, Schneck, & Pennings, 1971).

Any organization can engage in opportunistic behavior, regardless of the strength of its position relative to others. For instance, the management of a powerful supplier may behave opportunistically in relations with its dealers because it can readily exploit these weaker members of its organizational set and thus gain further advantage. On the other hand, relatively weak dealers may also behave opportunistically. Lacking more traditional bases of power, the management of these organizations may view opportunism as the only viable way of ensuring that their needs are adequately met in relations with a powerful supplier. For instance, in order to insure prompt and adequate delivery of certain types of equipment and parts from a supplier, a dealer may make false promises to devote a certain amount of showroom floor space to a new product line and to undertake a major local promotional campaign.

Williamson's theory focuses on the transaction costs of firms dealing with opportunistic organizations. What Williamson does not address are factors that either contribute to or detract from the propensity of a firm to behave opportunistically. If opportunism is indeed related to power, as we propose, it should be possible to explain the emergence of opportunistic behavior by dealers in relations with their primary suppliers by focusing on two important aspects of power—dependence and control over decisions.

Although the degree of dependence on a supplier will vary across dealers, in general dealers' dependence on a major supplier will be substantially higher than the supplier's dependence on any one dealer (Provan, 1982; Skinner & Gultinan, 1986). Within this general relationship, however, the

dependence of dealers on their primary suppliers is likely to vary, depending on such factors as the number and availability of alternative suppliers (Pfeffer & Salancik, 1978) and the internal strengths of a dealer, which may enable it to provide itself with many services suppliers often provide (Blau, 1964). Because fear of possible retribution against those who engage in self-serving and devious behaviors exists in any relationship, we propose that dealers that are highly dependent on a primary supplier will not behave opportunistically. Because the typical dependence relationship between a primary supplier and an individual dealer is heavily weighted in favor of the supplier, a highly dependent dealer can suffer substantial negative consequences at the hands of its primary supplier if the supplier believes the dealer is actively opportunistic. For instance, a supplier may withhold key information or needed parts and equipment from the dealer, or ultimately, it may terminate the relationship. Viewing supplier-dealer relations in a more positive light and building on the findings of Hall, Clark, Giordano, Johnson, and Van Roekel (1977), we suggest that high levels of dependence may also indicate a relationship that is highly cooperative, resulting in little need for opportunism. Conversely, a low level of dependence on a supplier may well lead to high levels of opportunism among dealers; if caught, these dealers can more easily shift to other suppliers or provide critical services on their own than can their highly dependent counterparts. Thus,

Hypothesis 1: Opportunistic behavior by dealers in relations with their primary supplier will be negatively related to dealer dependence on that supplier.

The second aspect of power we propose as related to dealer opportunism is a primary supplier's control over dealers' decisions. Such decisions could include those related to broad dealer policies or to daily operations. Because all dealers are at least moderately dependent on their primary suppliers, and some are highly dependent, suppliers have at least the capacity to exert control over some dealer decisions (Provan, 1980; Wrong, 1968) and thus constrain dealer autonomy. Although some dealers may welcome such control, we contend that most dealers will attempt to preserve their decision autonomy. One way in which dealers may resist is by engaging in opportunistic behavior. For instance, to avoid supplier interference on decisions about carrying a new piece of equipment, dealers will sometimes knowingly exaggerate the expected demand for the new item or for other products, depending on whether or not they want to carry the new item.

The explanation of the relationship between control and opportunism offered here is consistent with Brehm's (1966) theory of psychological reactance. Very generally, that theory holds that when individuals have their freedom constrained, they are likely to resist, taking actions to improve their condition. In dealer-supplier relations, when suppliers try to control dealer decisions, such actions may well take the form of opportunistic behavior.

Hypothesis 2: Opportunistic behavior by dealers in relations with their primary supplier will be positively related to supplier control over dealer decisions.

METHODS

Sample

Data were collected in 1986 via a national survey of farm and power-equipment dealers. We selected a simple random sample of 800 dealers from the membership directory of the National Farm and Power Equipment Dealers Association. A cover letter accompanied a mail survey explaining the purpose of the study and promising confidentiality. Questionnaires were returned by 226 dealers, yielding a 28.2 percent response rate.

Consistent with figures for the entire industry, fewer than 1 percent of the dealers sampled (.4%) were owned by the suppliers. All others were either separately owned corporations (78.8%), partnerships (4%), or single proprietorships (12.4%).¹ These dealers typically sell the equipment of several suppliers, including John Deere, Allis Chalmers, International Harvester, Massey-Ferguson, Ford, White, New Holland, and J. I. Case. One of those firms is usually recognized as a dealer's primary supplier.

Measurements

Since opportunistic behavior is almost impossible to observe firsthand, and since even reputational measures are highly unreliable owing to the unobtrusive ways in which people are likely to exercise such behavior, we questioned the heads of each dealership directly using a 9-item scale based on the work of John (1984). We added several items to the original scale to conform to the present research setting (the Appendix lists all 9 items). Dealers were asked the extent to which they agreed or disagreed with each statement. As responses to the individual items were highly intercorrelated, we summed them to arrive at an opportunism scale ($\alpha = .82$).

Three variables were used to measure dealer dependence on a supplier. The first focused on dependence for critical services. We selected services critical to the dealers' operations through interviews with a preliminary group of dealers in one locale. These items were combined to form a 16-item service-dependence scale (see the Appendix; $\alpha = .88$). To obtain a more objective measure of dependence, we also asked dealers to report the total number of suppliers with which they were engaged. Finally, following Emerson (1962) and Blau (1964), we measured the availability of alternative suppliers. Using a 10-point scale, with 1, not as likely as present supplier, to 10, more likely than present supplier, we asked dealers to report the likelihood that another supplier could provide the same support in accomplishing their goals as their primary supplier. In contrast to the measure of service dependence, high scores on the scales measuring the number of suppliers and the availability of alternatives reflected low dependence on any one supplier. All three measures were found to be statistically related,

¹ The remaining dealers (4.4%) listed themselves as "other."

although not strongly enough to warrant combining them into a single measure (mean interitem $r = .20$).

Control over dealer decisions by a supplier was measured using scales that separately assessed formalization, or control through rules and procedures, and centralization, or control through direct involvement by a supplier's management ($\alpha = .65$ and $.76$, respectively). Specific items appear in the Appendix. Formalization and centralization are conceptually related in that both are methods of decision and behavior control. However, as Blau and Schoenherr (1971) and other contributors to the organizational structure literature have found, the concepts may be statistically unrelated (as was the case here, $r = -.04$) or even negatively related, since using the two methods of control together is often not necessary.

RESULTS AND DISCUSSION

Table 1 presents the means, standard deviations, and correlations for all variables. The two hypotheses were tested using multiple regression analysis, the results of which are reported in Table 2.

Overall, the two sets of independent variables, dealer dependence on a primary supplier and supplier control of dealer decisions, predicted dealer opportunism in relations with a primary supplier fairly well. The multiple correlation for the entire predictor set, $.40$, is statistically significant at the $.001$ level, explaining 14 percent (adjusted R^2) of the variance in opportunism. Furthermore, the mean score for opportunism (22.73 for the 9-item scale) generally supports Williamson's view that although opportunism is not pervasive in interorganizational relationships, it does in fact occur frequently enough to affect them.

The first hypothesis was supported for two of the three measures of dependence. Specifically, dealers' perceptions of their dependence on their primary suppliers for 16 services emerged as a strong, significant predictor of dealer opportunism ($\beta = -.25$, $p \leq .001$), and the reported actual number

TABLE 1
Means, Standard Deviations, and Correlations For All Variables^a

Variables	Means	s.d.	1	2	3	4	5
1. Opportunism	22.73	8.86					
Dependence							
2. Service dependence	79.84	12.99	-.31**				
3. Number of suppliers	3.12	1.91	.13*	-.13*			
4. Availability of alternatives	3.67	2.38	.21**	-.31**	.17**		
Control over decisions							
5. Formalization	19.90	4.90	.08	.02	-.03	-.08	
6. Centralization	13.07	5.53	.25**	-.17**	-.04	.26**	-.04

^a $n = 226$

* $p < .05$

** $p < .01$

TABLE 2
Multiple Regression Results for Predictors of Dealer Opportunism^a

Independent Variables		Betas	F	Significance
Dependence				
Service dependence		-.25	14.08	.001
Number of suppliers		.10	2.42	.05
Availability of alternatives		.08	1.24	n.s.
Control over decisions				
Formalization		.11	2.93	.05
Centralization		.19	8.90	.01
Multiple R	.40		8.50	.001
R ²	.16			
Adjusted R ²	.14			

^a n = 226

of current suppliers to a dealer (only one of which was the primary supplier) was a modestly significant predictor of opportunism ($\beta = .10, p \leq .05$). Only the perceived availability of an alternative supplier as a replacement for a primary supplier emerged as a nonsignificant predictor of opportunism, although the direction of the beta weight was positive and the zero-order correlation was positive and statistically significant ($r = .21, p \leq .01$). Since service dependence was correlated fairly strongly with availability of alternative suppliers ($r = -.31$), the nonsignificant beta weight for this variable as a predictor of opportunism was not entirely unexpected and suggested that the service-dependence measure was relatively stronger. (Positive findings for the last two dependence measures imply an inverse dependence-opportunism relationship since a higher score on either measure means low dependence on a primary supplier.)

Overall, the strength of these findings lends reasonable support to the idea that highly dependent dealers are less likely than moderately dependent ones to engage in opportunistic behavior with their primary equipment suppliers, either because the dealers fear the consequences of getting caught or because high-dependence relationships with suppliers are likely to be cooperative and supportive.²

Results fully supported the second hypothesis, pertaining to supplier control over dealer decisions. Control of dealer decisions through supplier rules and procedures (formalization) and through the direct involvement of supplier management (centralization) were positively related to opportu-

² Since dealer dependence on a primary supplier will almost always be at least moderately high, opportunism is a potentially relevant issue in their relationship. However, dealers would seem to have little need to be opportunistic in relations with a supplier when their dependence on that supplier is low. This suggests a curvilinear relationship between dependence and opportunism across the full range of possible dependencies. Using our restricted sample, which contained no low-dependence dealers, we tested for, but did not find, a curvilinear relationship between service dependence and opportunism.

ism. Results were stronger for centralization. It appears that dealers are likely to view either method of decision control by a primary supplier, but particularly centralization, negatively, which leads to at least some resistance in the form of opportunistic behavior.

The stronger finding for centralization is itself interesting and points to the difference in the two types of control. It may seem that the chance to behave opportunistically would be greater for dealers when control over their decisions is through a supplier's rules and procedures, since the supplier's management would not be actively monitoring compliance. However, given the findings, an alternative explanation seems more likely. The decisions asked about in our study were rather broad and involved the daily running of the dealers' businesses. Thus, dealers would be likely to view attempts by suppliers to control those decisions through direct involvement negatively, especially when the suppliers are physically far removed from the dealers, their customers, and their problems. Supplier control of such decisions would imply a loss of managerial autonomy and provoke opportunistic behavior. Alternatively, dealers may view the existence of supplier rules and procedures as somewhat less constraining and controlling than centralization because of the formal, less personal way in which the former are imposed. Additionally, rules tend to change infrequently, thus giving both suppliers and dealers consistent guidelines within which all can operate reasonably effectively.

As an additional step in the analysis, we introduced the dealers' total profits for 1982, 1983, and 1984 as a sixth independent variable to determine if profitability had any impact on dealers' use of opportunistic behavior and if the two hypotheses would still be supported. Because only 143 of the original 226 dealers reported their profits or losses, separate regression equations were run, both with and without the profitability measure, for the reduced sample. The results (not shown) indicated substantial support for the two hypotheses whether or not profitability was included in the equation. The beta weight for profitability was only .01 and was not significant.

SUMMARY AND CONCLUSIONS

To summarize the findings, we found modest levels of self-reported instances of opportunistic behavior by agriculture equipment dealers to exist in relations between those dealers and their primary suppliers. In support of Hypothesis 1, dealer opportunism was found to be negatively related to dealer dependence on a primary supplier. Consistent with Hypothesis 2, dealer opportunism was positively related to supplier control over dealer decisions on the basis of measures of both formalization and centralization.

The study's major shortcoming is its methodology. Since all data were collected from a single source within each dealership, and since most of the measures were based on dealer perceptions of levels of opportunism, dependence, and control over decisions, common method bias may well exist. Nonetheless, there is reason to believe that this problem is not so great as to

invalidate the results. Since the dealerships surveyed were small businesses, it is not unreasonable to expect that the head of each would have been the most knowledgeable person concerning dealer-supplier relations. Also, although objective data would have been desirable, collection of such data for the variables studied here, especially opportunism, would have been exceptionally difficult and costly, if not impossible, particularly for a large national sample. Finally, we would expect that any bias in the self-reporting of opportunism would be in the direction of understating the behavior. However, denial of opportunistic behavior did not appear to be a problem. Specifically, the mean item response on the 6-point opportunism scale was 2.53, suggesting a willingness on the part of dealers to report their opportunistic behaviors in a confidential setting.

The existence of moderately high levels of opportunism among dealers is particularly interesting in light of Williamson's belief that such behavior is most likely in small-numbers exchange relations. On a national level, farm equipment suppliers have a large number of potential dealers from which to choose, suggesting that dealer opportunism should be quite low. On the other hand, if Williamson's theory is correct, for the organizations studied here the small numbers condition appears to operate at the local level, where suppliers have relatively few dealers to choose from. Thus, the emergence of the dealer opportunism we found would not be unexpected.

Two other limitations should be noted. First, since the dealer-supplier relationships studied here are more constrained than those in a market but less constrained than those in a hierarchy, direct comparisons with Williamson's (1975) ideas may be somewhat limited, making generalizations to the purer types unclear. Second, it may be that the growth and profitability of the industry being studied matters. The agriculture business has experienced difficult times in recent years; in a thriving industry, attempts by a supplier to control the decisions of a dealer may not lead to opportunism but instead to a breaking-off of the relationship and the establishment of new dealer-supplier ties. Although we cannot answer these questions here, they clearly point to additional research issues that should be addressed if opportunism is to be understood more fully.

Although the above problems may in some ways limit the impact of this research, we believe that the extreme lack of empirical work on opportunism in interorganizational relations makes this study a useful contribution to the literature on the topic. In particular, the significant findings reported here indicate that issues related to power appear to be critical for understanding the emergence of opportunistic behavior in relations between organizations.

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APPENDIX

All questions referred to dealer interactions with their primary equipment supplier.

Opportunism was measured with the following questions, with a response range of 1 = definitely agree to 6 = definitely disagree. "R" indicates reverse-coding. (1) I have always provided my primary supplier a completely truthful picture of my business. (2) I feel that it is OK to do anything within my means that will help further my own interests (R). (3) Sometimes I have to alter the facts slightly in order to get what I need (R). (4) I have sometimes promised to do things without actually doing them later (R). (5) Complete honesty does not pay when dealing with my primary supplier (R). (6) Sometimes I present facts to my primary supplier in such a way that I look good (R). (7) On occasion, I have to lie to my primary supplier about certain things in order to protect my interests (R). (8) My primary supplier isn't always truthful with me, so I am not always completely candid with them (R). (9) Sometimes I have to exaggerate my needs in order to get what I really need from my supplier (R).

Service dependence was measured by the following: "Please indicate the extent to which you depend upon your primary equipment supplier for each service" (1 = no extent to 6 = great extent). (1) Product warranty, (2) quality of advertising, (3) pricing, (4) completeness of product line, (5) amount of advertising, (6) volume discounts, (7) rate of new product develop-

ment, (8) parts returns policy, (9) credit terms, (10) response to emergency orders, (11) clarity of catalogs/price lists, (12) timing of new product development, (13) technical support, (14) training, (15) call frequency, (16) responsiveness to field problems.

Formalization (1 = definitely agree to 6 = definitely disagree) was measured by the following: (1) If a written rule does not cover some situation, we make up informal rules for doing things as we go along. (2) There are many things in this business that are not covered by some formal procedure for doing it. (3) Usually, my contact with this company and its representatives involves doing things "by the rule book" (R). (4) My contact with this company and its representatives are on a formal pre-planned basis (R). (5) I ignore the rules and reach informal agreements with this company to handle some situations.

Centralization (1 = definitely agree to 6 = definitely disagree) was measured by these questions: (1) I have the final say in decisions regarding day-to-day operations. (2) Any major decision that I make has to have this company's approval (R). (3) In my dealings with this company, even quite small matters have to be referred to someone higher up for a final answer (R). (4) I have to ask company reps before I do almost anything in business (R). (5) I can take very little action on my own until this company or its reps approve it (R). (6) My primary equipment supplier makes the major decisions affecting my business and tells me after the fact (R). (7) I am left alone to make day-to-day decisions for myself.

Keith G. Provan is an associate professor of management in the College of Business and Economics at the University of Kentucky. He received his Ph.D. degree from the State University of New York at Buffalo. His research interests include interorganizational relationships, organizational power, and strategic-level decision making.

Steven J. Skinner earned his D.B.A. degree at the University of Kentucky. He is currently an associate professor in the College of Business and Economics at the University of Kentucky. His research interests include interorganizational relationships in distribution networks and sales management.

CEILINGS IN THE RELIABILITY AND VALIDITY OF PERFORMANCE RATINGS: THE CASE OF EXPERT RATERS

JEFF A. WEEKLEY

GLI

JOSEPH A. GIER

BellSouth

Ratings gathered from expert raters under nearly ideal conditions (world class judges of the figure-skating competition at the 1984 Olympics) were examined for evidence of reliability and validity. In general, the results suggest that the ceiling on rating reliability and validity may be higher than indicated by previous research.

Although the most common form of performance evaluation, performance ratings are known to be subject to a variety of biases that reduce their reliability and validity (Landy & Farr, 1980). Borman (1978) suggested that the problems inherent in most performance appraisals are partially due to a number of constraining real world conditions common to most rating situations and partially due to limitations in the abilities of raters. Kavanagh, MacKinney, and Wolins (1971) similarly observed that human ability seemed to place a cap, or limit, on attainable levels of convergent and discriminant validity. Thus, although there is some agreement that perfectly reliable and valid ratings are unattainable, an interesting question not fully addressed in the literature concerns the upper limits of rating reliability and validity.

The issue is an important one, for it may indicate how much room for improvement is left in the design of performance appraisal systems. Only if expert raters making ratings under favorable conditions can provide extremely reliable and valid ratings should greater attention be directed at refining the abilities of raters and improving rating conditions. Obviously, to address this question it is essential to identify raters who can truly be considered experts and external factors that might constrain reliability and validity.

Regarding what constitutes an expert rater, Feldman (1985) argued that accurate raters are likely to be those with extensive experience with the

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performance domain to be rated that is based on either performing or supervising performance of the job in question, or both. In addition to experience with the job, experts should have experience and training as raters of that domain. As for external conditions, it has been suggested that rating reliability and validity will be maximal under conditions in which raters all view the exact same sample of job behavior (Borman, 1978). In addition, research (Heneman & Wexley, 1983; Murphy, Martin, & Garcia, 1982) has shown that even minor delays between observation and evaluation can produce significant reductions in rating accuracy. Thus, reliability and validity should be enhanced when all raters make their ratings immediately after viewing the same sample of performance. Finally, rating validity may be susceptible to the motivational biases of raters (DeCotiis & Petit, 1978). Kane's (1981) suggestion that opening raters' ratings to public scrutiny may minimize motivational biases is consistent with that idea. If raters know that other raters and ratees will see their ratings, the deterrent value of having inaccurate ratings exposed may offset the motivation to give inaccurate ratings (Kane, 1981).

In summary, to estimate the upper limits of the reliability and validity of ratings by expert raters, several conditions are necessary. First, the raters must be extremely familiar with both the performance domain to be rated and the actual rating task or process. Additionally, all the raters must base their ratings on the same sample of ratee behavior and make their ratings immediately after observing that behavior. Finally, the raters must be motivated to give unbiased ratings. The only scenario we found that seemed to meet all the criteria was that of judges rating the performance of athletes in world-class sporting events. In the sport of figure skating, for example, a panel of judges rates the performance of each skater on two dimensions. Because all judges at a world-class figure-skating event possess years of training and experience, they can reasonably be considered experts, both for the performance domain and the rating task. Also, each judge observes each skater on exactly the same sample of performance, and ratings are made on a standard set of dimensions and publicly posted immediately after each skater's performance. Thus, it can be argued that these conditions provide an opportunity to determine the reliability and validity with which expert raters can provide evaluations under highly favorable conditions.

METHODS

The United States Figure Skating Association provided the archival data used in this investigation, ratings of the contestants in the men's and women's figure-skating events at the 1984 Olympics. Ratings were obtained from nine judges for 46 skaters, 23 in each the men's and women's events. For each skater-judge combination, there were actually two sets of ratings, one set for the short program and one set for the free-skating program. Each judge rated each skater on two dimensions during both programs.

Each of the skaters qualified for the Olympics by winning or placing highly in one of the various national or regional championships held before

the Olympic competition. The 23 men were from 15 different countries, and the 23 women represented 16 different countries.

In the two-minute short program, the dimensions on which the skaters are judged are called required elements and presentation. The required elements are seven required moves; standard deductions are made for missing or omitting any of the elements. Presentation is the beauty of a skater's routine, how well it is choreographed and so forth.

In the free-skating program, the women skate for four minutes and the men for four and a half minutes. The dimensions along which the skaters are evaluated are called technical merit and artistic impression. There are no required elements in the free-skating programs. Technical merit concerns style, composition, and choreography, and artistic impression is an evaluation of a skater's overall look—for instance, judges may consider the skater's athleticism.

The composition of the panel of judges in Olympic figure-skating competitions is determined in part by the performance of each country's skaters in the previous Olympics and in part by random selection from a pool of world-level judges. To become part of the world-level pool, judges go through an extensive training and screening process. For example, a person interested in becoming a judge might first attend a judge's school designed to teach the basics of the sport and the judging process (former skaters may skip this step). The candidate would then be classified as a "trial judge" for local competitions. Trial judges rate competitors, but their ratings do not count on the standings. Rather, the ratings are compared for consistency with those of the real, or "test," judges. If a candidate's ratings are consistently close to those of the real judges, he or she may become a test judge and work local competitions. Judges wishing to advance up the ladder repeat this process at the regional, national, and international levels. Judges reaching the international level by age 45 are eligible to become world-level judges and work the Olympics. For former skaters, the entire process usually takes about 15 years; those without a skating background typically require 20 years to advance to world level. Each world-level judge is subject to continuous monitoring by the International Skating Union, which is empowered to review the evaluations of the judges and to suspend those suspected of nationalistic bias.¹ Thus, the judges studied were a highly trained, experienced, and monitored group of experts in figure skating.

¹ Although it is arguable that the judges are still likely to show bias in their ratings in favor of skaters from countries friendly to their own and against skaters from unfriendly countries, we found evidence to suggest this is not the case. Specifically, we dummy-coded the country of both the skaters and judges as either Western block or Eastern block. These two variables were entered with the dimension variable into a three-way ANOVA. If judges were favorably biased in their ratings toward skaters from friendly countries, we would expect to find a significant interaction between the country of skater and country of judge, but results of four separate analyses (one each for the men's and the women's short and free-skating routines) showed no significant interactions between those two variables. In short, although our analyses do not allow us to conclude that bias was nonexistent in this competition, there is also no evidence to suggest that it did exist.

The reliability of the ratings studied was examined in the same manner as in Borman's (1978) study. For each dimension, we computed an intraclass correlation coefficient as an index of interrater reliability. We also adjusted these coefficients to the more typical two-rater case using the Spearman-Brown prophecy formula.

Rating validity was examined with analysis of variance (Kavanagh et al., 1971). We replicated the basic $9 \times 23 \times 2$ ANOVA (judges \times skaters \times dimensions) four times across four different data sets, the short and the free-skating programs for the men and the women. Because there were no within-cell replicates in any of the four data sets, we substituted the three-way interaction term for all occurrences of the residual error term. As with other multitrait-multirater ANOVAs, the relevant sources of variance and their meanings were as follows: (a) significance of the ratee main effect would be evidence of convergent validity, (b) significance of the interaction of ratee and performance dimension would be evidence of discriminant validity, and (c) significance of the rater-by-ratee interaction would be evidence of rater disagreement across dimensions. We also looked for halo error by computing a simple Pearsonian correlation between the two dimensions across the 207 observations in the four data sets; although those observations were not independent, correlations computed across this data set did not differ greatly from those computed across a set of independent observations created by averaging individual raters' dimension ratings.

Finally, to facilitate comparison between the results of the current investigation and those of other analyses, we computed intraclass correlations (Kavanagh et al., 1971). As those authors noted, intraclass correlations provide a basis for comparison across studies because they are measures of source variance relative to error variance. We compared the results of the present study to the results of other multitrait-multirater studies summarized by Borman (1978) and Mount (1984).

RESULTS AND DISCUSSION

Table 1 presents interrater reliability coefficients. As can be seen, interrater reliability was consistently high, ranging from .93 to .97 for the full complement of judges. After we adjusted these estimates to the two-judge case, the reliabilities remained relatively high, the average being .81. In general, the ratings examined here exhibited fair, but not extraordinarily high, interrater reliability.

Table 2 presents the results of the ANOVAs. The ratings in each of the four data sets demonstrated exceptional convergent validity. The intraclass correlation for the ratee main effect approached 1.00 in all cases, dropping below 0.98 only once, and this term accounted for 78 to 95 percent of the variance in the ratings.

Discriminant validity was fair to impressive, depending on the skating routine examined. The intraclass correlations for the ratee-by-performance dimension interaction terms ranged from .42 to .89. Interestingly,

TABLE 1
Interrater Reliability by Dimension for Men's and Women's
Short and Free-Skating Programs

Program	Dimension	Nine Judges	Two Judges
Short	Men's required elements	.94	.78
Short	Men's presentation	.93	.76
Short	Women's required elements	.96	.84
Short	Women's presentation	.94	.78
Free	Men's technical merit	.95	.81
Free	Men's artistic impression	.94	.78
Free	Women's technical merit	.96	.84
Free	Women's artistic impression	.97	.88

for both the men and the women, discriminant validity was much greater in the short program than in the free-skating program. The intraclass correlations and the degree of variance accounted for were larger in the short-program data than in the free-skating-program data. In fact, because the relevant interaction term accounts for no more than 1 percent of the variance in the data from the free-skating programs, it can be concluded that there is little discriminant validity in the ratings of the longer, less structured skating routines.

Although the ratings studied demonstrated very good convergent validity and fair to good discriminant validity, they also evidenced high levels of rater disagreement. In fact, in the free-skating data, the intraclass correla-

TABLE 2
Validity Evidence

Effects	df	Sum of Squares	F ^a	Variance Component	Intraclass Correlation Coefficient	ω^2
Men's short program						
Ratee	22	118.8	347.7	.299	.95	.81
Ratee \times dimension	22	12.6	37.0	.062	.80	.09
Ratee \times rater	176	6.6	2.4	.011	.41	.04
Men's free-skating program						
Ratee	22	90.2	893.4	.228	.98	.92
Ratee \times dimension	22	1.0	9.5	.004	.48	.01
Ratee \times rater	176	4.6	5.7	.011	.70	.05
Women's short program						
Ratee	22	204.6	800.2	.516	.98	.78
Ratee \times dimension	22	19.6	76.6	.098	.89	.08
Ratee \times rater	176	9.5	4.7	.021	.65	.04
Women's free-skating program						
Ratee	22	127.9	1096.1	.323	.98	.95
Ratee \times dimension	22	0.9	7.4	.004	.42	.01
Ratee \times rater	176	4.0	4.3	.009	.62	.03

^a All Fs significant at $p < .001$.

tions for the rater disagreement terms were greater than those for the discriminant validity terms. The rating variance attributable to rater disagreement ranged from 3 to 5 percent.

As for halo error, the judges in all four data sets provided highly inter-correlated ratings. The correlation between required elements and presentation in the short programs was .91 for the women and .87 for the men. For the long programs, the correlation between technical merit and artistic impression was .97 for the women and .96 for the men.

The results of the present study become more meaningful when compared with the results of previous multitrait-multirater studies of rating validity. Table 3 summarizes previous research. As can be seen, the ratings in the current study showed convergent validity greatly in excess of that typically observed. By the same token, however, these ratings evidenced more rater disagreement than has been the case in previous research. Although results for discriminant validity were somewhat inconsistent, judges in the current study still provided ratings with superior discriminant validity to that typically observed. Finally, a comparison to Borman's (1978) earlier work shows that the evidence for reliability (.81 in both studies) and discriminant validity (.61 vs. .58) was quite similar for the two studies, but both convergent validity and rater disagreement were markedly higher in the current study.

In general, the results of the present study suggest that the ceiling on rating reliability and validity may be quite high. For convergent validity, the

TABLE 3
Intraclass Indexes for Previous Studies

Studies	Convergent Validity	Discriminant Validity	Rater Disagreement
Prien and Liske (1962)	.40	.17	.37
Albrecht, Glaser, and Marks (1964)	.46	.40	.30
Lawler (1967)	.41	.23	.41
Nealy and Owens (1970)	.55	-.13	.43
Boruch, Larkin, Wolins, and MacKinney (1970)	.40	.20	.43
Kavanagh, MacKinney, and Wolins (1971)	.44	.13	.50
Dickinson and Tice (1973)	.48	.13	.38
Heneman (1974)	.18	-.39	.13
Holzbach (1978)	.44	.16	.56
Borman (1978) ^a	.67	.58	.14
Mount (1984)	.16	.27	.26
Means of previous studies	.42	.16	.36
Means of current study ^b	.97	.61	.60

^a The values used for Borman's (1978) study are the averages for the samples of psychologists and graduate students across the two sets of rating stimuli.

^b The values for the current study are the averages across the four data sets (the men's and women's short and free-skating programs).

results suggest that validities near unity can be achieved under the rating conditions we examined. The rater main effect accounted for almost all the variance in the ratings, indicating that the judges were able to agree in their evaluations of skaters, but primarily in a global sense. Probably the most interesting question this research raises is why the ratings of the judges we studied showed so much more convergent validity than those of raters in other research have shown. One answer may lie in the availability of constant feedback. Recall that after each skater's performance the ratings from all judges were posted for public scrutiny. As a result, judges could see how their evaluations compared with those of their peers. Judges with idiosyncratic standards should have been easily identifiable and the direction of their divergence from the norm readily apparent. This self-others comparison process, which is the basis of much of the judges' training, may result in a shared frame of reference among the judges and thereby may produce high degrees of interrater reliability and convergent validity. Future research should examine the effects of such normative feedback on rating accuracy. If it appears that such feedback improves accuracy, research should then focus on determining the nature of the intervening processes that account for the noted improvement.

Discriminant validity varied systematically across the short and free-skating programs (mean intraclass indexes were .77 and .45, respectively), a fact that may have to do with the differences in the routines. In the short program, the skaters must incorporate a number of required jumps and moves into their routines. It is possible that the judges, by knowing what to expect, are better able to distinguish between the required elements and the skaters' presentation. In the free-skating program, where the skaters do not have required behaviors, the judges' ability to differentiate between the various dimensions may be lower. If that is true, it suggests that raters who have very clear expectations about the types of behaviors they are to observe will be better able to differentiate between performance dimensions in their evaluations. Future research might examine this issue by, for example, comparing discriminant validity indexes for different levels of jobs. Raters may better discriminate between individual performances across dimensions for lower-level jobs, where work is generally fairly routine, task-oriented, and prescribed, than for higher-level jobs, where work can be ambiguous, process-oriented, and characterized by long completion cycles.

Although the evidence for validity was greater in the current data than it has been in most other studies, the evidence for rater disagreement was also greater. Rater disagreement basically reflects differences across raters in their rank-ordering of ratees' overall performance. Plots of the data showed that the disagreements came in evaluations of contiguously ranked skaters. In other words, although the judges agreed that the top-ranked skater of each gender was better than skaters 3 through 23, there was some disagreement about the top-ranked skater versus the second-ranked skater, and so forth. Apparently, although the difference between skaters at the top and the bot-

tom of the performance continuum was large enough to be consistently reported, the same was not always true at various points along the continuum.

Looking at the interdimension correlations suggests that these ratings may reflect a high degree of halo. This likelihood is, however, consistent with recent research indicating a slight positive relationship between rating accuracy and halo error (e.g., Berman & Kenny, 1977; Borman, 1975; Borman, 1979). Moreover, examination of the current performance domain suggests that a certain, possibly high, degree of halo should be present. Competition in the Olympic Games is likely to be restricted to skaters who are extremely proficient at all aspects of world-class figure skating. It seems reasonable to assume that those who are good at one dimension but not another will fail to qualify for the competition. In short, the observed halo may well be true, not illusory (Cooper, 1981). Future research might also examine the effects on halo of normative feedback, which we discussed earlier in this section. It may be possible, for example, to develop a highly differentiated cognitive representation of a job in raters through providing them with feedback in the form of highly differentiated ratings. Providing novice raters with feedback on ratings with minimal covariation from other judges may allow manipulation of the complexity of the cognitive representation the novices develop. In this way, dimensions they had previously viewed as redundant may become conceptually distinct to raters.

An alternative explanation for these results suggested to us by a reviewer was that the high degrees of convergence and rater disagreement and the low degree of discriminability observed in the current data may have been due to the small number of dimensions examined. In other words, the use of only two dimensions may have resulted in the collection of essentially global ratings. Global ratings, goes the argument, should evidence low discriminability and high convergence and rater disagreement. To examine this possibility, we correlated the number of performance dimensions used in each of the studies summarized in Table 3 with the intraclass indexes for convergent validity, discriminant validity, and rater disagreement. Results showed no significant relationship between any of the intraclass indexes and the number of performance dimensions rated (correlations were $-.17$, $-.11$, and $.06$). This secondary analysis indicated that number of dimensions bears no simple relationship to performance-rating criteria.

Another alternative explanation for the results cannot be ruled out: range restriction in the current ratee sample may have obscured discriminant validity and exacerbated rater disagreement. However, it should be remembered that the raters providing the ratings are world-class figure-skating judges accustomed to rating the performance of world-class figure skaters. Although the number of ratees we studied was undoubtedly restricted compared to the world's population of skaters, it was far less restricted than the population of skaters that the judges in this study were used to evaluating. In short, the range of performance that the judges rated may not have been particularly restricted compared to what they typically eval-

uated. As one reviewer noted, the fact that range restriction could have affected convergent validity but apparently did not supports this interpretation.

In total, these results suggest that expert raters are capable, under certain conditions, of reliably providing ratings with very good convergent validity and better discriminant validity than has typically been the case. Paradoxically, rater disagreement and halo error may be considerably higher under the same conditions. Unfortunately, it is not known what in the current rating situation contributed to the improvements in rating validity. Research that teases out these contributions should find immediate application in the design of appraisal systems and training programs.

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Jeff A. Weekley received his Ph.D. degree in human resource management from the University of Texas at Dallas. He is currently the director of training and development for GLI, the parent company of Greyhound and Continental Trailways Bus Lines. His research interests are focused on performance appraisal, employee selection, and utility analysis.

Joseph A. Gier earned his Ph.D. degree in industrial-organizational psychology from the University of Nebraska. He is currently manager of human resources research for BellSouth Corporation in Atlanta. His research interests include performance appraisal and organizational assessment and change.

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If it is necessary to distinguish some numerals in a table from others (for example, to indicate which factor loadings define a factor), boldface type can be used. In the typed manuscript, any numerals that should be set in boldface type should be underlined with a wavy line. This possibility should not be used when other conventions, such as footnotes, are sufficient.

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The spacing and lettering used in figures should allow for subsequent reduction in size by as much as 50 percent so that the figure will fit the size of the *Journal's* page. The original artwork for figures should not be submitted until after the manuscript has been accepted for publication.

Figures should be numbered consecutively with arabic numerals and their position in the text indicated as for tables (see above). Each figure should be presented on a separate page with FIGURE (typed in all caps) and its number centered above it and a short identifying title in capital and small letters centered underneath the figure number. Example:

FIGURE 1
Model of Contextual Influences on Performance

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An alphabetically ordered list of references cited in the text should be included at the end of the article. References should begin on a separate page headed REFERENCES. Continue the pagination.

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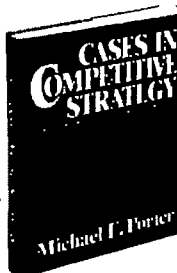
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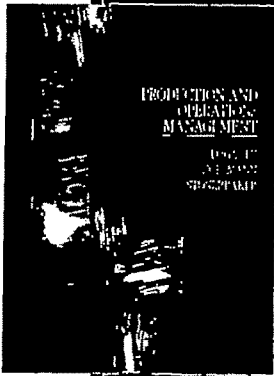
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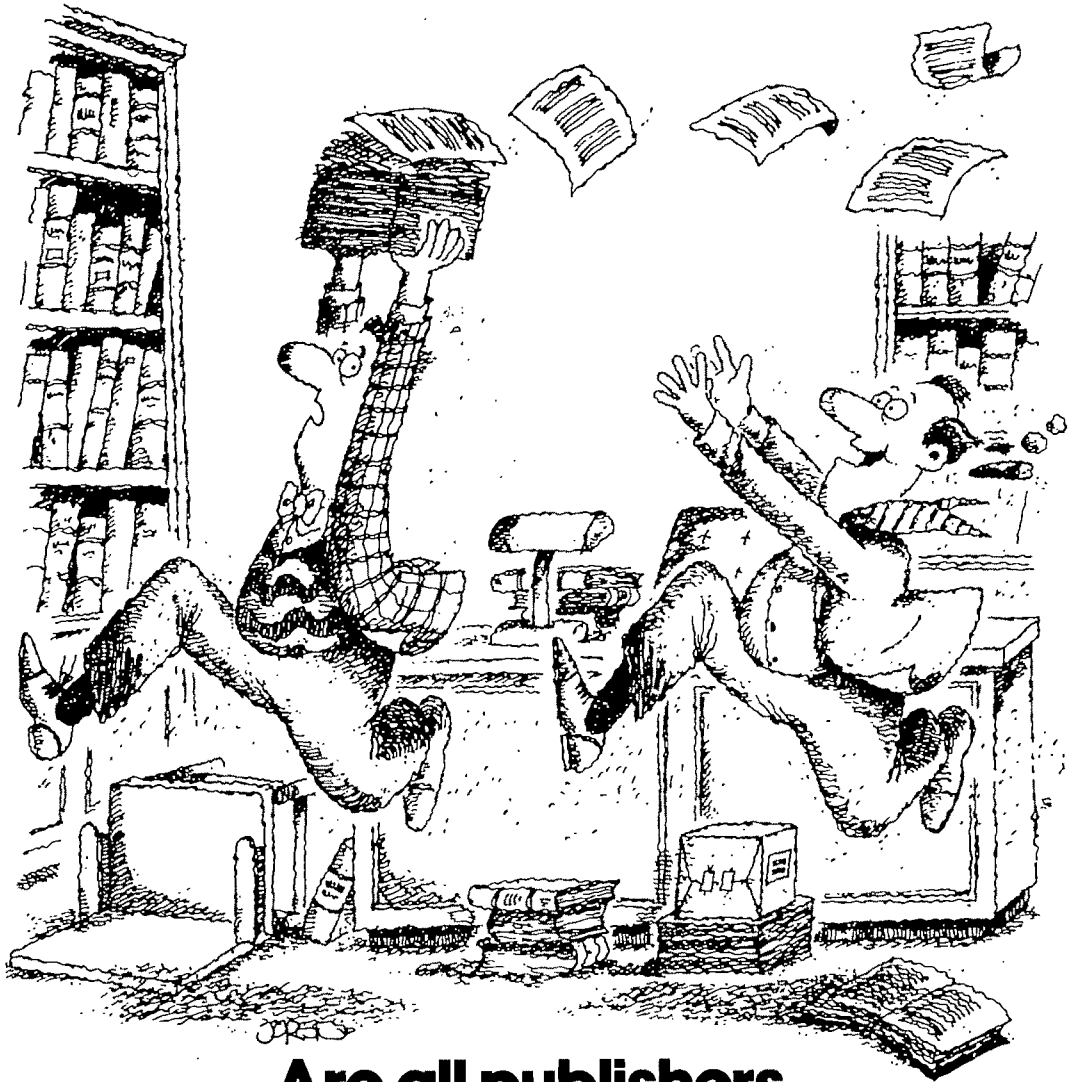
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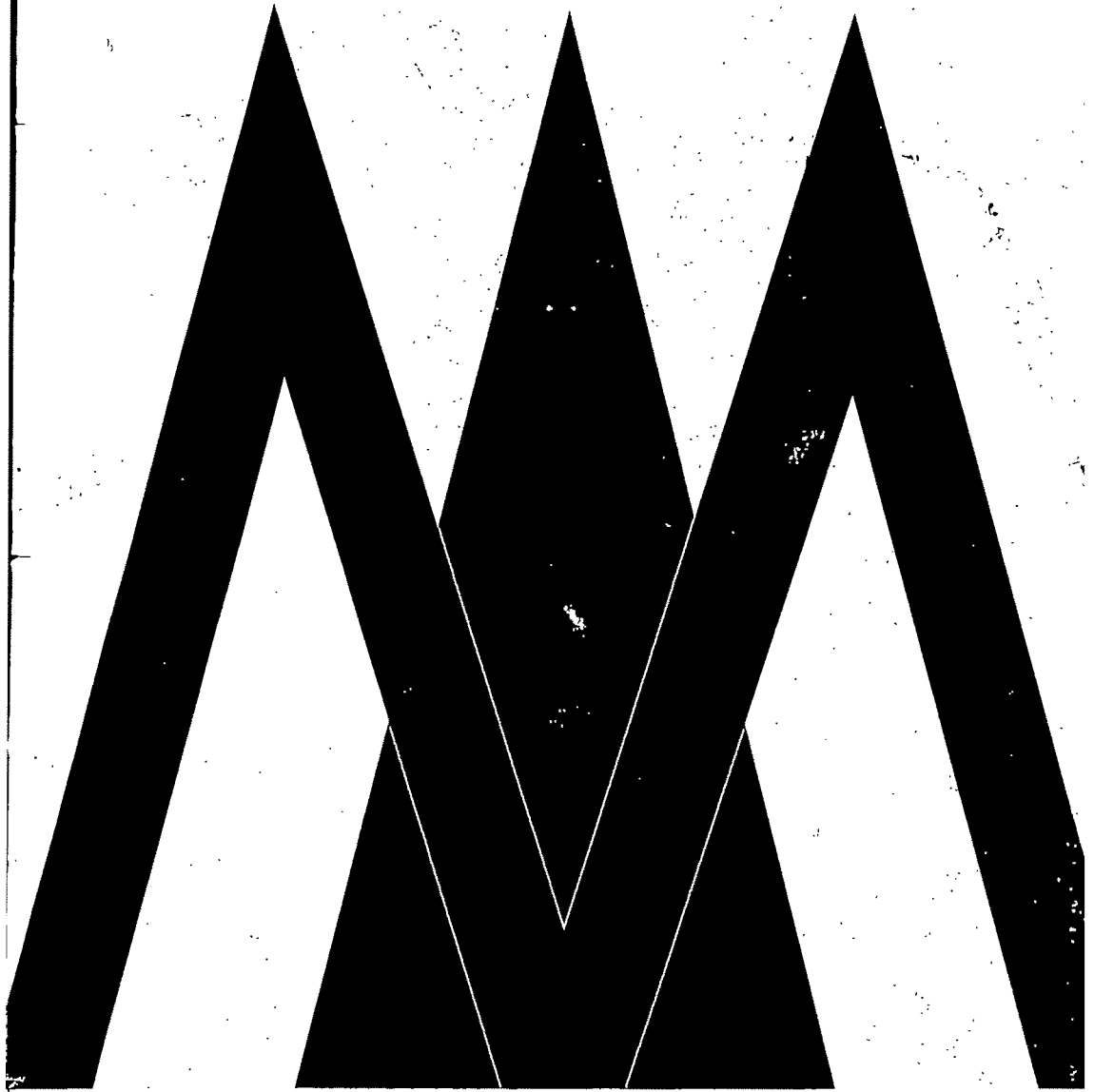
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WHEN CASHIERS MEET CUSTOMERS: AN ANALYSIS OF THE ROLE OF SUPERMARKET CASHIERS

ANAT RAFAELI
Hebrew University of Jerusalem

In a qualitative investigation of the role of supermarket cashiers, the influence of management, co-workers, and customers over cashiers was analyzed. Customers had immediate influence over cashiers at the time of job performance; management influence was more legitimate but more remote. The analysis further revealed that cashiers and customers held different views on who had the right to control service encounters and that cashiers employed various strategies to maintain their control of those encounters.

The customer is paying for the merchandise. But he is not paying my salary. Why does he think he can tell me what to do?

—a supermarket cashier

Service organizations and “service encounters” (Czepiel, Solomon, & Surprenant, 1985) are an inevitable part of modern life. We can hardly get through a day without engaging in a service transaction—with a bank, a grocery store, or the phone company. In view of this social trend, management theoreticians and practitioners are also trying to understand, and improve, the context of service (Albrecht & Zemke, 1985; Czepiel et al., 1985; Desatnick, 1987; Hochschild, 1983).

Key participants in any service transaction are service employees. It is they whom customers meet on entering a department store or boarding an aircraft. Thus, a single employee may tint a customer's image of a service enterprise. Indeed, research has documented that service employees can be important to promoting organizational goals. Schneider, Parkington, and Buxton (1980), for example, reported that bank employees' perceptions of the organization they work for are closely related to customers' perceptions of the quality of service that the organization provides. Moreover, Sutton and Rafaeli (1988) found a complex relationship between the behavior of clerks in convenience stores and organizational sales.

Some evidence has also suggested that organizational strategies can manipulate the external facade that service employees convey. In particular, Hochschild (1983) reported that the gracious behavior of flight attendants and the aggressiveness of bill collectors is largely attributable to the man-

I would like to thank two anonymous reviewers for their detailed and thoughtful comments that significantly improved this paper. I would also like to thank Bob Sutton, Eyal Ben-Arie, and Boaz Shamir for their comments on earlier versions of the paper. The study was supported by a grant to the author from the Mutual Fund of the Hebrew University of Jerusalem.

dates of their management. Rafaeli and Sutton (1987) extended Hochschild's (1983) work and illustrated how service organizations attempt to shape their organizational image by monitoring and controlling the emotions that their employees convey.

Nonetheless, a host of issues about service contexts and service employees remain unexamined. There is a consensus that service is bad (Russel, 1987), but there isn't much agreement about how it can be improved.

One critical question concerns the relationship between employee-customer dynamics and the attainment of organizational goals. Marketing experts have long acknowledged the influence of this relationship over consumer behavior and resultant organizational profits. In *Personal Selling*, for example, Jacoby and Craig addressed the question, "How can the salesperson influence the customer to buy?" (1984: 1). Jacoby and Craig discussed strategies that salespeople use for persuasion and influence and contended that interpersonal attraction affects selling effectiveness.

There is also initial evidence that, because service occupations are boundary spanning (Adams, 1976; Bowen & Schneider, 1985), interactions with customers hold special qualities for service employees. Lombard (1955) reported how salespeople took a customer's rejection of merchandise as a personal rejection of themselves. Similarly, Whyte (1948) related the personal aggravation, sometimes to the point of crying, that waitresses felt when customers did not leave a tip.

Whyte (1948) and later Mars and Nicod (1984) argued that the relationship between waiters or waitresses and their customers is especially complex because of the conflict between servers' interest in controlling service encounters and their desire that customers feel good about the service and leave large tips. In his famous restaurant study, Whyte referred to the waitresses' struggle to "get the jump" on the customers (1948: 132-133). Butler and Snizek (1976) documented how this struggle can affect a waitress's tip. Mars and Nicod later generalized the notion to a discussion of "the politics of service" (1984: 65).

Whyte (1948), Butler and Snizek (1976), and Mars and Nicod (1984) examined only restaurant employees. Nonetheless, their reasoning suggests that other service organizations may benefit from considering the special complexities of transactions with customers. The present study extended that notion. My goal was to place another stone on the path toward improved service by offering a close examination of the role of service employees and their interaction with customers. Understanding the role of service employees should promote the development of knowledge and theory about service operations.

The initial goal of the study was to understand the relationship between service employees and various members of their organizations.¹ For the sake

¹ Several authors have recently referred to customers as "partial employees" (cf. Mills & Morris, 1986: 726). The term is used to suggest that customers are actually temporary members or participants of service organizations because their participation is crucial to service production.

of simplicity, I chose a very mundane service context—that of supermarket checkout clerks. Relationships between cashiers and customers were initially perceived as one part of a web of relationships involving various other parties, including management and co-workers. As the study evolved, however, customers emerged as having a unique role in shaping cashiers' "role set" (Biddle, 1979; Katz & Kahn, 1978: 188–192; Merton, 1957). Customers were found to have a great degree of immediate influence while cashiers are on the job; management's influence on the other hand, was legitimate, but remote. The work of Marks and Mirvis (1981) and Trist (1977) would suggest that customers constitute the transactional environment of supermarket employees and therefore affect behavior at the time of task execution. In contrast, management authority only sets the general tone of the environment and affects extreme behaviors of service employees, notably those governed by rules.

Unraveling the reasons for the immediate cashier-customer relationship was therefore an objective. Observations of the cashiers studied suggested that the immediacy of the clerk-customer relationship creates a certain tautness. Closer scrutiny revealed a tension about who was in control. Thus, as in the findings of Whyte (1948) and of Mars and Nicod (1984), the struggle for control between cashiers and customers seemed to strain the checkout process. Cashiers and customers had very different perceptions of who had the right to control this process. And cashiers, who considered the checkout process a part of their job, were observed to develop strategies to maintain control of their encounters with customers.

The study described was inductive (Glaser & Strauss, 1967). My goal was to conduct an in-depth investigation of a set of people employed in a service job, in the interest of advancing the development of theory on the service encounter. Because of the logic of inductive research (Glaser & Strauss, 1967), the methodology employed is first described; the insights and theory that emerged from the analysis of the data then follow.

METHODS

A qualitative study was conducted in a chain of supermarkets in Jerusalem, Israel, during the winter and spring of 1986. The individuals studied were cashiers and customers in six stores that were randomly selected from all the chain's stores in Jerusalem.

The Research Context: Supermarkets in Israel

Supermarket technology in Israel is similar to that in the United States: a multibrand product assortment of foods and nonfoods, a large physical scale, a large sales volume, and self-service are typical features of supermarkets (Goldman, 1981; Rachman, 1975). After loading their carts with desired items, customers wait in line until a cashier processes the purchases and accepts payment. Cash registers are automated; cashiers type in the code of an item and the register rings up the price. Electronic scanners are still rare

in Israel; only one of the stores included in the study had them. Pay for cashiers is low, usually around the minimum wage.

Four distinct attributes of Israeli supermarkets should be noted. First, Israeli customers pack their own purchases. Customers are expected to bring their own shopping bags and to pack each item right after a cashier has processed it as counters by the cash registers are usually small. Second, Israeli supermarkets offer a home delivery service, usually for a nominal fee. When this service is requested, it is the cashier's responsibility to pack the merchandise in a large plastic crate. Third, in Israel, going to a farmers' market is the prevalent alternative to supermarket shopping; such shopping is considered cheaper but less convenient. Fourth, consumer rights and the concept of service are not as developed in Israel as they are elsewhere in the West. Cashiers and other service employees are often argumentative, and rudeness is common.

Jerusalem is a large, cosmopolitan city. Most supermarket shoppers are permanent residents, although there are also tourists and students. The city has rich and poor neighborhoods, but the diversity is not extreme. Supermarkets and shoppers in Jerusalem are representative of Israel as a whole.

All the observed supermarkets employed a store manager, a head cashier, and 8–15 cashiers. All the store managers studied were men and all the head cashiers and cashiers were women.² Personnel files indicated that this was representative of the organization. Store managers were the official supervisors of all store employees and were also responsible for other aspects of store performance, including ordering merchandise and dealing with vendors. Thus, managers were the top authority for cashiers. Managers did, on occasion, order cashiers back to their registers or discuss work schedules with them; such monitoring was, however, the direct responsibility of head cashiers.

Head cashiers, the direct supervisors of line cashiers, were usually senior cashiers who had been promoted. Head cashiers were also responsible for collecting and counting the money from the various registers. Head cashiers usually sat in the manager's office, answered the phone, went over work schedules, and did other administrative chores; only rarely (once or twice during the day) would a head cashier walk "down" to the registers.³

Data Collection and Analysis

Data collection included unstructured observations of cashiers and customers, participant observation as a cashier, interviews with cashiers, and interviews with customers. I conducted the observations and interviews in

² Since all the cashiers observed and interviewed in the study were women, I use the feminine pronoun hereafter in reference to cashiers for the sake of convenience.

³ Employees used the term "down" in all of the stores included in the study when referring to the register area; cashiers referred to the office as "up there" and to the cash register area as "down." The usage may reflect the physical structure of these stores, since the office is usually situated a few steps higher than the registers. It may also reflect the hierarchical relations in the stores.

Hebrew but took notes and developed thoughts and theory throughout the study in English. Research notes did not name individuals; when it was necessary—where repeated references to a particular cashier were desired—specific cashiers were coded by a letter or a set of letters to ensure confidentiality of the data.

I did most of the data collection and analysis, employing research assistants as needed in various portions of the study. One assistant made unstructured observations. Two other assistants helped in the process of data analysis by working with me on categorizing incidents and phenomena and participating in brainstorming sessions.

Unstructured observations were conducted in all six stores. Observation times were predetermined to ensure appropriate time sampling. Store hours in Israel are 7:30 a.m.—1:00 p.m. and 3:30 p.m.—7:00 p.m.; observations were planned so that each store was visited once during early morning, once during late morning, once during early afternoon, and once during late afternoon. Additional visits were conducted, one in each store, after the initial round of observations was completed. These visits were randomly spaced throughout the day.

Observations were conducted in a nonobtrusive manner, and each lasted 30–45 minutes; the exact duration of an observation could not be predetermined because the observers did not want to evoke suspicion. After entering the store, an observer usually walked around the aisles for a few minutes and then stopped at the magazine rack or the chocolate rack as if searching for an item; these racks are usually close to the checkout area and offer a good vantage point for observation of cashiers and customers. After selecting an item, the observer stood in one of the lines and continued to observe the cashier and the customers. If the lines were short, the observer acted as if she had forgotten to buy something and walked out of the line and back into the store.⁴ After a few minutes she again began to stand in line. After her order had been processed, the observer stood behind the cash register area, as if waiting for someone. Because of the size of the stores and the heavy influx of customers, this process did not seem to evoke suspicion.

The management of the corporation was advised that such observations would possibly be conducted; store managers, however, were not informed about specific store visits. Considering the public nature of the behaviors observed, it does not seem that there is an ethical question about such observations (Mintzberg, 1979; Salancik, 1979; Webb, Campbell, Schwartz, Sechrest, & Grove, 1981).

A second form of data collection involved *participant observation*. I went through the process of applying, training, and working as a cashier.⁵

⁴ All the research assistants who acted as observers were women.

⁵ The corporate personnel manager chose the site of my participant observation according to store needs for a cashier. Senior management and the store manager were aware that I was conducting a study about supermarket cashiers. I informally told individual cashiers about the study whenever they asked or whenever it seemed appropriate. At the end of the study, all the cashiers were briefed about the study.

The participant observation consisted of three months of part-time employment for about 18 hours a week. My part-time, short-term status was not unusual; about 60 percent of the cashiers in this chain are employed part-time, and turnover among cashiers is high, up to 50 percent a year. Detailed field notes, in English, were taken after each shift of participant observation.

Semistructured interviews with cashiers were the third means of data collection. I conducted interviews with a random sample of 30 cashiers employed in stores other than the one in which the participant observation was conducted. The sample was stratified by age and tenure. The interview included general questions about the work as well as questions probing perceptions of customers and customer behavior. The interview also asked about two critical incidents (Flanagan, 1954) involving customer attempts to influence cashiers. Cashiers were asked how they would react to the following two incidents that had been observed during the unstructured observation phase of the data collection: 1) A customer said to a cashier, "How can you wear three earrings on one ear. That is ridiculous." 2) A customer said to a cashier, "Will you stop talking and start working! You're wasting everyone's time." The Appendix gives the complete interview schedule.

Interviews, which were conducted on store premises during the employee's shift hours, each lasted 45–90 minutes; the motivation and participation levels of the interviewee determined the exact length. All interviews were conducted in one session, in Hebrew, and were tape-recorded. I summarized notes from these interviews in English. I also interviewed store managers and head cashiers, using an adapted version of the cashier's interview schedule.

Semistructured interviews with customers were also conducted. I interviewed 30 men and women who had shopped in one of the stores, 5 from each store. I approached customers after they had finished their shopping and asked them if they were willing to participate in the study, telling them that they would be asked to discuss their shopping experience. Customers who agreed to be interviewed (about 60 percent of those who were approached) were invited for a cup of coffee at a nearby coffee shop. Of the customers interviewed, 21 (70%) were women. The interviewees' ages ranged from 32 to 65. The Appendix also presents the schedule for the interviews with customers.

Data analysis began with unstructured brainstorming sessions among members of the research team and proceeded following Miles's proposals for qualitative data analysis (Miles, 1983; Miles & Huberman, 1984). Miles did not offer a structured sequence of steps to guide such analyses. Rather, he suggested continuous conceptual development throughout projects. Specifically, he discussed a process of "intertwining of analysis and data collection, in an attempt to formulate classes of phenomena, and to identify themes in the data" (1983: 126). Three specific rules of thumb proposed by Miles guided the present analysis: examining whether any particular generalization held true for different people or occasions, testing all possible implications of any one proposition, and examining closely any extreme-bias cases (Miles, 1983: 127).

The analysis started with a rough working framework: understanding the relationship between the observed service employees (cashiers) and various members of their role set. We went back and forth between the emerging theory and the data and mostly attempted to let ideas stimulated by the sites and the data revise and reshape the general framework. This process revealed the set of relations that a cashier encounters.

An attempt to understand the qualitative difference between customers, managers, and co-workers followed. This phase included repeated references to the notes from the various data sources. I followed an iterative process of systematically going back and forth between theoretical insights and data. The goal of the process, which followed the recommendations of Glaser and Strauss (1967), was to verify support of theoretical developments and search for inconsistencies between new insights and the data.

This iterative process suggested that, compared to their relationships with their managers and co-workers, cashiers spent more time with customers, were physically closer to customers, and got more feedback and information from customers. Cashiers also viewed customers as more crucial than managers or co-workers. In short, customers appeared to have immediate influence over cashiers, and management's influence, although perceived as legitimate, was remote.

During the iterative process, the importance of control for both cashiers and customers began to emerge. In light of previous writings on the importance of control, which I encountered in a preliminary literature review, I pursued a closer focus on the dynamics of control over the observed service encounters. This focus suggested interesting and important differences between cashiers' and customers' perceptions of the right to control the encounters. Thus, another round of data-scanning was necessary to search for support and inconsistencies between theoretical insights on the struggle for control and the data. During the process of refining the theoretical implications of the data, I also drew on feedback from colleagues and organizational contacts.

To familiarize the reader with the socialization of supermarket cashiers, a brief overview of the process of becoming a cashier follows. Next, the set of relations a cashier encounters on the job is presented. The differences between the influence role of customers and that of management, and cashiers' and customers' perceptions of control of service encounters are then examined. Finally, I present a typology of strategies employed by cashiers to gain control of interactions with customers.

FINDINGS

The Process of Becoming a Cashier

Learning how to be a cashier was, in my experience, an extremely informal process. Table 1 summarizes the various stages of the socialization process through the end of my first day of participant observation. As can be seen, I spent less than a half hour with the various members of the organizational hierarchy, other than peers or customers.

TABLE 1
Cashier Socialization Process up to the End of the First Day
of the Participant Observation

Stage	Approximate Duration
Telephone call to head office	2 minutes
Meeting with personnel manager	13 minutes
Meeting with store manager	2 minutes
Waiting	7 minutes
Meeting with head cashier	5 minutes
Session with training cashier and customers	3¼ hours
Time spent with other cashiers and employees	20 minutes

The formal socialization began with a brief meeting with the personnel manager of the corporation about two weeks before the participant observation started. The meeting consisted of a few personal questions and assignment to a store. After the meeting a secretary asked me to take a short screening test, which mostly concerned knowledge of arithmetic, and had me sign a form labeled "Basic Rules of Cashier Behavior." This form included ten rules of behavior; I later learned that, among cashiers, the form is nicknamed the "Ten Commandments." The Appendix displays these rules.

The encounter with the formal organization also included a two-minute meeting with the store manager who basically said "See the head cashier," and a five minute talk with the head cashier, who gave me a general introduction to the store including information on store hours, instructions on how to punch the time clock, and about where to put my coat and purse, and a very brief and informal introduction to my "trainer," an older woman with 16 years of experience on the job. The shortness of my interaction with members of the formal hierarchy contrasted sharply with the three and three-quarter hours I spent with customers on the very first day. These hours were spent standing behind the cashier who had been designated as my trainer. She explained that she was often selected as a trainer for new cashiers because she "enjoyed it and also knew the work really well." Nonetheless, it was quite quickly evident that she had little structured, formal training to offer. After a few minutes of "This is the register," "See, there are special keys for produce, drinks, meats," and "You need to learn the codes for the various items," she said "OK, now you can watch me work"; she then went on to "pass customers through,"⁶ expecting me to continue watching.

During the training period, the trainer occasionally reentered her training role. For instance, pulling a large notebook from her drawer, she said "Here are all the codes for the different items. Take it home and you can

⁶ The term used by the cashiers to describe a transaction was "pass through." Thus, a cashier might say, "I passed [the customer] through and then went to get change," or "Let me just pass her through and then I'll help you." This terminology is especially interesting because in reality it is merchandise that is being passed through, not customers.

learn the codes in the evening." Yet structured training was a rare event, for me and for other trainees who were observed throughout the study; most of the time trainers passed customers through while trainees sat or stood behind them and watched.

In short, in the process of becoming a cashier, there was little structured, formal interaction with the trainer or with management. Because of the store's open-space design, however, there was a lot of unmediated exposure and close physical proximity to customers. Such exposure is an integral part of a cashier's job from the very beginning. It was also the first clue to the differences between the various role senders, that is, the various holders of expectations about the cashiers' role (Katz & Kahn, 1978: 190).

The Set of Relations That Cashiers Encounter

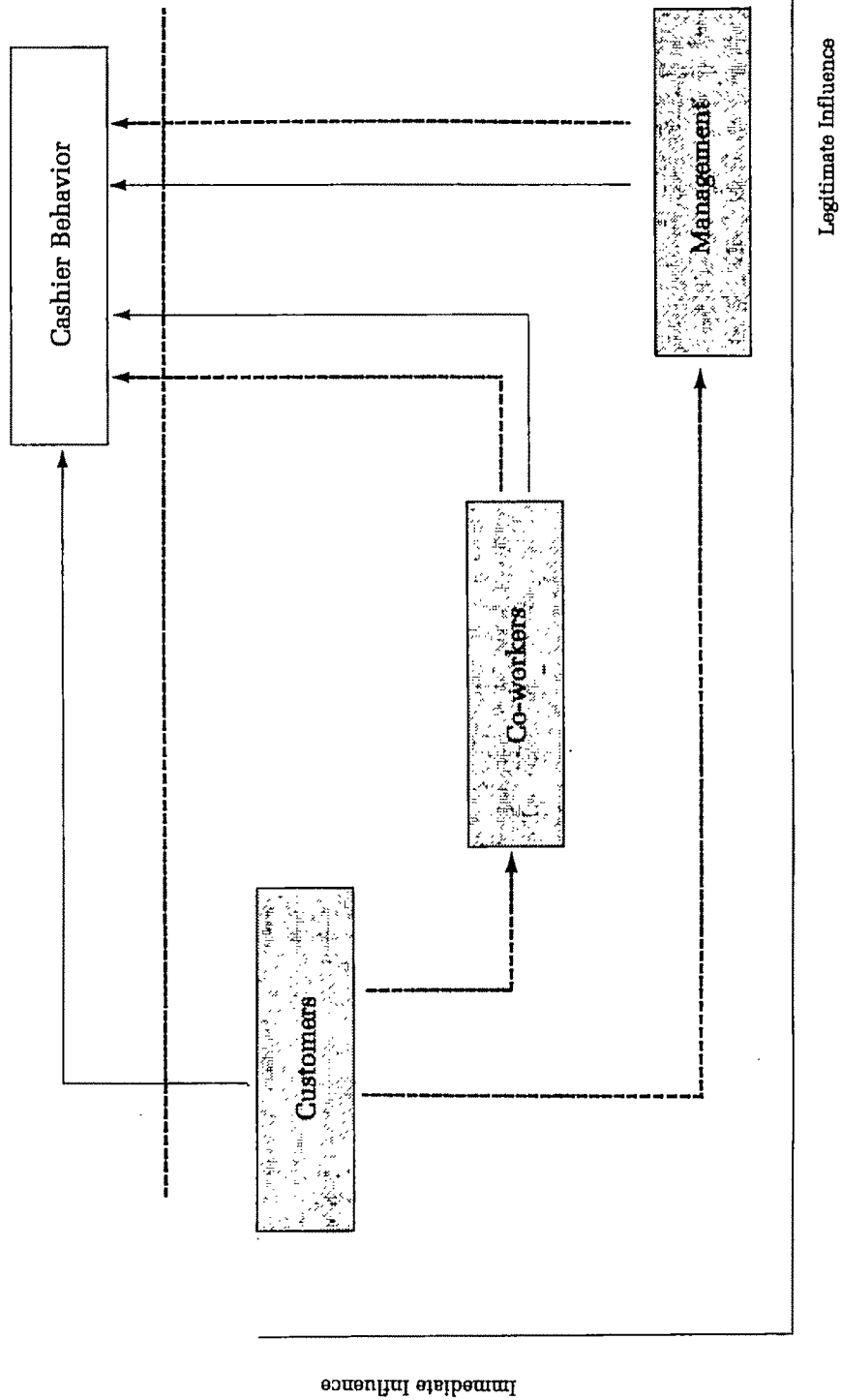
Figure 1 summarizes several aspects of the relationship of customers, co-workers, and management to cashiers. Cashiers were placed outside the figure because the intent is to summarize the relationships of the various other parties to cashiers. Furthermore, the figure displays only relations to cashiers. The solid arrows in Figure 1 imply direct influence. Thus, customers have direct influence over cashiers, as do co-workers and management. The broken lines in Figure 1 indicate indirect influence; customers also have indirect influence over cashiers through other employees and through management.

Figure 1 includes two axes that facilitate the understanding of cashiers' role set. The horizontal axis refers to legitimate influence. The person with formal authority over a cashier—her manager—has the strongest legitimate right to influence the cashier's behavior. The vertical axis in Figure 1 suggests the dimension of immediate influence. The results of this study suggest that customers hold more immediate influence at the time of job performance than either co-workers or management. The immediacy of customer influence is due to the physical proximity between cashiers and customers, the extent of time they spend together, customers' opportunity for supplying direct feedback and other information, and the immediate importance that cashiers attribute to customers.

Management power. The horizontal axis of Figure 1 refers to legitimate influence. In the cashiers' formal organization (Katz & Kahn, 1978), management holds the greatest amount of legitimate influence because it represents the employing organization and has the power to reward (French & Raven, 1960).

Legitimate power belongs to management by definition, and cashiers are well aware of this. Cashiers usually accentuated behavior according to the rules (the Ten Commandments) whenever the manager or assistant manager walked around the register area. Similarly, during my training I was explicitly told, "Sure you can keep a cup at the register. Just be sure he [the manager] doesn't see it." Moreover, implied consent of the manager or the head cashier allowed the breaking of organizational rules. To illustrate, when a cashier wanted to get a pastry from the bakery across the street, she

FIGURE 1
Parties and Dynamics Driving Cashiers' Behavior: Customer, Co-worker, and Management Influence



usually asked the manager or the head cashier if he or she would also like something (PO).⁷ Because of insurance liability, cashiers were not allowed to leave the store during work hours (PO). But the unwritten rule seemed to be that if a member of management was a party to such activity, "It was OK to do it" (PO).

Management's legitimate influence (Figure 1) is also due to the store manager's apparent control over formal rewards; the manager handed out monthly pay checks and holiday bonuses (PO). Management's reward power is not as strong as it could be since wages in the chain are centrally determined and are not linked to performance. Moreover, the store managers have very little leverage when it comes to personnel policies. However, a manager can fire a cashier, especially if she is caught disobeying rules, and can have an effect on promotions. Thus, cashiers refused to be tape-recorded when they talked about eating or smoking at the register because the Ten Commandments prohibited such activities. As one cashier said, "They could immediately fire me if they knew" (I). Similarly, when one cashier was called to the manager because a customer had reported that she pocketed some money, the other cashiers immediately began to sympathize: "Poor D., now he will fire her" (PO).

As Figure 1 further indicates, customers have no legitimate influence. Co-workers—other cashiers—were, however, occasionally observed to exert a moderate amount of legitimate power. This was rare, but it occurred, for example, when as a newly hired cashier, I felt that my trainer was an authority. Trainers had the authority to decide how well a trainee was doing and when she could begin working alone (PO, I). I also heard a senior cashier urge a younger co-worker to "work more quickly, stop talking to your friends, can't you see that there is a long line waiting?" (PO). The younger cashier clearly reacted to this comment by focusing more directly on her register and discontinuing her conversation with her friend; she also said to her friend (casually, but in a very soft voice), "She [the more senior cashier] is almost like the manager around here" (UO).

Occasionally, customers might also attempt to influence cashiers' rewards. But such attempts have to operate through co-workers or management, as implied by the broken arrows in Figure 1. In order to punish a cashier who pocketed money, a customer had to report the incident to the manager (PO); the cashier in this event was ultimately fired. Similarly, when customers wanted to reward cashiers for desirable behavior, they commented about it to the manager or to other cashiers. To illustrate, several customers said to me while I was in training: "You really have a very good trainer; she is the best one around." This was always said when my trainer was around, and in a loud enough voice so that she could hear. Thus, it was

⁷ For the sake of simplicity, where it is not evident from the text the following codes are used to denote the source of quotations: I = an interview with a cashier, UO = unstructured observation, PO = participant observation, and CI = an interview with a customer.

a form of indirectly complementing the trainer. Along similar lines, one customer was heard saying to a manager who happened to be standing by a cash register, "You should really do something for her; give her a bonus or something; she does such a good job" (UO).

Customer power. The vertical axis of Figure 1 suggests that customers, and therefore customer influence, are much more immediate than management and management influence. Co-workers, in turn, have more immediate influence over cashiers than management, but less than customers. Five factors cause this immediacy: physical proximity, the amount of time customers and cashiers spend together, the amount of feedback customers give, the amount of information they provide, and the crucial role cashiers attribute to customers. The following examines each of these factors in detail.

Cashiers are physically much closer to their customers than to anyone else. About 25 inches separate a cashier and her customer, as opposed to the 80 inches or more separating two cashiers. Management is very remote, usually many yards away. The physical structure of supermarkets means that cashiers have little opportunity to interact with each other or with management without an audience of customers.

Moreover, cashiers usually view other cashiers either from the back (during training) or from the side. They view management from below (see footnote 3), or from far away. In contrast, there is constant frontal contact with customers. To gain the physical proximity that people enjoy, a cashier has to leave her work station and walk over to whomever she wishes to meet. That is, she must stop her work. Customers resent such breaks, as does management (I, CI). Thus, because of the physical structure of the supermarkets, cashiers can easily and continuously get verbal and nonverbal messages from customers. Communication with co-workers and with management is more difficult than it is with customers, and it is much less intimate since it is usually in front of an audience.

In short, the physical layout of supermarket work constrains interpersonal relationships among cashiers and makes customers the most immediate source of communication. Throughout the study I observed that the physical layout makes for little informal interaction among cashiers and that the informal network of relations among cashiers was very weak. To illustrate, approximately two hours of my first participant observation shift had passed before any of the other cashiers asked my name. By the end of the participant observation, I had not managed to collect much information about the other cashiers. I barely knew the names of all the other cashiers. I knew little about their personal lives. Likewise, they knew very little about me.

Several cashiers specifically mentioned that the physical distance between cashiers, combined with the noise and hustle in the store, usually do not allow interaction among cashiers or between cashiers and management (PO, I). Indeed, during the participant observation, it was often impossible to talk to cashiers while they were working. One cashier said,

You need to talk to someone. And the only one you can talk to is customers. But if you talk to them too much you can make mistakes (I).

A second reason for the greater immediacy of customer influence is the amount of time cashiers spend with customers, compared to the amount of time they spend with any of the other members of their role set. This was first evident from the extremely brief formal socialization procedure encountered in the process of becoming a cashier (see Table 1).

Observations of cashiers during their routine work revealed a pattern similar to that encountered on my first day and reported in Table 1. Approximately 78 percent of cashiers' time was spent interacting with customers; only 13 percent of their time was spent interacting with management, including task-related interactions, such as verifying a price or getting change. The constant interaction with others was an attractive job attribute for many cashiers:

I looked for a job where I would be with people. I couldn't see myself in an office job (I).

I liked the fact that there would be a lot of people around me. Otherwise I would get bored (I).

Nonetheless, once she has started working, a cashier may find it burdensome that the customers are constantly there.

Cashiers spend most of their time with customers because that is the way their work is structured. They are instructed to work independently; what one cashier does is usually relevant only to customers, and a cashier is expected to be equipped to deal with most customer needs. Certain events do require a cashier to interact with management or co-workers (e.g., verifying a price, getting check approval, asking for a break), but walking over to a fellow employee for a friendly chat is clearly a waste of time that interferes with the work.

Events that include interacting with co-workers or with management require time. Such use of time is often unpleasant to the cashiers because customers view it as a waste of time (UO, CI). One cashier summarized this feeling well: "What do I care how I pass my eight hours, but the customers get really angry when things move really slowly or if I have to leave the register" (UO). Thus, cashiers try to avoid "wasting" their time dealing with management or other store employees. To illustrate, cashiers expressed annoyance when customers changed their mind about purchases, and the head cashier had to be called for a cancellation (PO, UO). Many cashiers were aggravated when their registers seemed stuck for some reason and they had to call for help (UO, PO). Likewise, upon encountering an unmarked item, many cashiers relied on the price that the customer reported, rather than asking a co-worker or the manager (UO). Several cashiers specifically mentioned that they encouraged customers to pay cash to avoid spending the time to get checks approved:

For checks I have to get approval and it wastes time; but I can get in trouble if I don't get approval. So I like cash, only cash (I).

A third reason for the greater immediacy of customer influence is the amount and immediacy of the feedback that customers provide. The phys-

ical proximity between cashiers and customers increases the degree of verbal and nonverbal communication between them. The great amount of time that cashiers spend with customers also increases the probability of such communication. Thus, customers have the opportunity to provide cashiers with immediate positive or negative feedback.

Comments like "Oh, that is really nice of you" (PO) and "You work so fast" (UO) constitute positive feedback; "Your check-out is slower than all the other ones, you know" (UO) and "Why can't you be more polite" (PO) are examples of immediate negative feedback from customers. In contrast, management gives inconsistent, delayed, partial feedback that previous research has shown to have less powerful effects than immediate feedback (Hilgard & Bowers, 1975).

Customers' attempts to discourage cashiers from interacting with other cashiers or with management are another form of feedback. Customers make such attempts because they resent the "time wasted" (UO, I). They often try to persuade cashiers that it is unnecessary to take this time, saying "It is OK, the check is OK, you don't have to waste time getting approval" (UO) or "Why do you have to keep running back and forth to the office? It is such a waste of time" (UO).

Customers may also offer information that a cashier wants but cannot get elsewhere on her job. Since cashiers attend to customers in order to get this information, the stage is set for immediate customer influence. Customers offer three types of information: work-related information, general knowledge, and information about their status that may help cashiers elevate their self-attributed status.

First, customers may offer information that helps a cashier continue her work, such as information about the price or code of an item. Although such information is available elsewhere, obtaining it through the manager or through a co-worker would cause an unwelcome delay.

Second, customers may offer general knowledge that is not work-related. To illustrate, a cashier asked a regular customer⁸ who was the owner of a local furniture store how much a rocking chair cost, explaining that she wanted to buy someone a rocking chair as a present (PO). Along similar lines, a cashier asked a customer, "What do you do with this? Do you boil it?" (UO). One cashier presented the opportunity to obtain such information as a positive attribute of the job. She tried to encourage me to feel that the job was not as boring as it seemed:

After a while, after you learn how to work the cash register, it gets to be fun. You can talk to the customers and you can learn from them how to cook different things. You'll see (PO).

⁸ Cashiers frequently referred to "regular" or "permanent" customers. These were customers who shopped in the store regularly. Such customers often selected a favorite cashier, and cashiers frequently knew the names and addresses of these customers from taking checks or delivery orders.

Third, customers may offer information that helps cashiers elevate their self-perceived status. Goodsell (1976) documented that service employees clearly observe customer status cues. There were several indications here that cashiers derived status from the status of their customers. The head cashier's introduction to the store in which I conducted the participant observation was very brief (see Table 1), but it included the comment "You know, this is an important store, and very important people shop here, including people from [the local] TV [network]" (PO). Similarly, an interviewed cashier said, "We have some really famous customers here, and some of them buy on credit, without even paying, like the prime minister's house and the president's house."

Moreover, when asked "Who are your favorite customers," several cashiers responded by referring to a high-status person: "this professor who shops here with his wife" (I) or "the president's house" (I). Another cashier gave a more general response:

... people that have style. Some people just look classy. You know, they are dressed well and they know how to behave. I like them. It is respectable to work with them (I).

It is as if the status of the client raises the status of the clerk.

Finally, the immediacy of customer influence is enhanced because cashiers view customers as crucial. Cashiers summarized this notion:

We should always try to keep the customers happy. Sometimes I even sing to them. And if I see a customer leave a full cart by my register and prepare to leave the store I call him and try to convince him to stay. Because if the customers leave us, where will we be? They make the store. They make my salary (I).

Without the customers the store would never exist. Without the cashiers it might be hard. Without the manager—we get along, and you can always find a replacement for cashiers or managers. But not without the customers. They make the money (I).

In sum, although management's legitimate influence allows it to have a certain degree of remote control over cashiers, several factors set the customers apart as having the potential for immediate influence over cashiers. Management plans and rules may set the stage for the interaction between a cashier and her customer, but because of their physical proximity, the amount of time spent together, the flow of feedback and information, and the crucial role cashiers attribute to customers, it is the cashier and the customer who determine how this interaction unfolds.

The Struggle for Control Between Cashiers and Customers

As mentioned above, the interaction with customers was an attractive job attribute for many cashiers. The constant exposure to customers, however, may be more than was bargained for. Specifically, customers' perspective on the interaction with cashiers appears to be qualitatively different

from cashiers' perceptions of the same interaction. As one cashier said, "He is one of the customers and I have to pass him through and take money from him" (I). In contrast, customers said "I am paying, so I should get service" (CI) and "Since it is my time, don't I have a right to try and avoid wasting it?" (CI). What emerges is a struggle for control of the interaction.

Service encounters: Customers' perspective. The data suggested two key resources that guide customers' perceptions of service encounters in the supermarket: money and time. Customers who have given or are about to give money expect to get something in return. Customers may enjoy spending time selecting merchandise, but they resent time spent waiting for a cashier.

As far as customers are concerned, they are paying not only for merchandise but also for service:

When I go to the market all I want is good, cheap stuff. But a supermarket is supposed to offer something more. You pay more. So you should at least get a pleasant shopping experience (CI).

Why can't you be more polite? I am paying! And you are serving me you know! (UO).

Moreover, customers often view cashiers as liaisons between the retail organization and themselves: "She works for the organization, doesn't she?" (CI) and "She's the only one from the store that I get to talk to" (CI). Since they pay the organization, customers expect to have some say about how it functions. Thus, customers may comment to a cashier about things that are obviously not part of her job: "Why are shopping bags so expensive here?" (PO) or "Why don't they get those imported sardines anymore?" (UO). This is the only opportunity that customers see to influence the organization. Since customers are paying, they believe that the organization and its representatives—the cashiers—should deliver (CI).

From a customer's point of view, cashiers also determine how much money the customer must part with. Because money is very important, customers see themselves as having a right to monitor and control its expenditure. Customers were often suspicious that they were being cheated, as these comments from my interviews with them show:

Cashiers always steal.

You always have to watch over them carefully.

It's real easy for them to overcharge. You never have time to watch when they type the stuff. And every time I check the slip I find some error.

I also observed customers saying:

Please slow down. Last time they cheated me so I want to see what you type (PO).

Can't you wait so I can watch what you do? (UO).

It was hard, if not impossible, to assess the extent to which cashiers actually engaged in cheating (Mars, 1984). Over 80 percent of the incidents noted in the present study in which customers asked to check a price or a sales slip indicated no fault on the cashier's part. Nonetheless, the point is that since the customers are paying, they feel they have a right to monitor and control how much is paid, which implies monitoring and controlling the cashiers' behavior.

As with money, the desire to save time also drives customers to monitor the cashiers. The checking out process often causes bottlenecks in the store. Customers are forced to stand, wait, and do nothing while a cashier processes orders. Such waiting is a nuisance (Maister, 1985). Indeed, customers waiting in line were often annoyed, angry, and helpless; the aggressive reactions mentioned in Seligman's (1975) discussion of helplessness were frequently evident. To illustrate:

I can't stand it. Why can't they open another register? [very aggressive tone of voice] (UO).

I don't believe it [to a cashier who didn't know a code]. You sit here all day and you don't know the code for potatoes? As if this is something unusual! (UO).

Exhibiting behavior that is consistent with Maister's (1985) observations on the psychology of waiting in line, customers seek means to shorten their objective or subjective waits. They may do this by suggesting to cashiers various mechanisms for saving time. They also try to do things instead of letting the cashiers do them. I saw customers packing delivery crates (the cashiers' job), going to the shelves to check a price or a code, placing fruit and vegetables on the scale to be weighed, or placing items so the codes were easily visible (UO, PO). One customer tried to create group support, saying to other people waiting in line "Come on, let's help her, if we help her maybe things will move along a little bit more quickly" (UO). The following incident, which occurred during the participant observation, is also illustrative:

One customer could not find her checkbook, and seemed to be "wasting everybody's time" looking for it. Customers waiting in line put pressure on the cashier to start processing their orders; they glared at the cashier and glared at the customer. They offered suggestions about where the checkbook might be or suggested that maybe she could pay with a credit card. Then they began requesting that the cashier process the next customer's order while this woman was looking for her checkbook. One customer attempted to explain to the cashier that such a move would be logical. He said, "Since she is paying with a check, when she finds her checkbook you can take it from her."

In sum, because of the time and money involved, customers seek, and see themselves as having a right, to control their encounter with a cashier.

Service encounters: Cashiers' perspective. Customers' intense involvement in the service encounters studied creates resistance and resentment

among cashiers. As suggested by the quote at the beginning of this article, cashiers realize that customers want to control them, but they are not willing to relinquish control of the encounters. Cashiers seek control of service encounters because they feel they need and have a right to this control in order to do their job.

Cashiers perceive their main responsibilities to be to "pass customers through" (I) and "take money and give change" (I), functions requiring a fair amount of concentration. A cashier needs to recall the codes or prices of many unmarked items, to verify that she has entered the correct information into the register, to count the money she receives, and to count the change she gives out. At the same time, she needs to keep track of which items she has entered and to guard against customer theft. These tasks entail a responsibility, and errors may be personally costly to the cashier since cash differences can be deducted from her salary. Cashiers seek to maintain control over the checkout process in order to avoid errors.

Customers' attempts to control an encounter can also be offensive to cashiers. The consensus among cashiers is that they know best how to do the job, even though customers sometimes try to tell them otherwise:

It is my job. I know best how to do it (I).

He thinks that because he shops here he can run things. But I am here every day. It's my job. I know how to do it. And it drives me nuts when he tells me what to do (I).

Thus, when customers attempt to monitor cashiers' behavior and to tell them what to do, cashiers seek ways to establish who is in control.

There is also a strong theoretical rationale behind cashiers' struggle for control. Extensive research has discussed the psychological importance of personal control (Langer, 1983; Seligman, 1975; Sutton & Kahn, 1986). Goffman (1959) argued that control over an individual's immediate environment is especially important, explaining that "we seek control over the people in our environment with whom we interact, particularly individuals who are likely to react to us" (1959: 3). Since cashiers constantly interact with customers, it is clear why they struggle to control them. What is intriguing is the way in which this struggle is conducted.

Strategies in cashiers' struggle for control. The existing literature on service employee's fight for control (Bigus, 1972; Butler & Snizek, 1976; Mars & Nicod, 1984; Whyte, 1948) was used as a point of departure for developing a typology of the strategies employed by cashiers for reclaiming control of service encounters. The data suggested four such strategies: ignoring customers, rejecting customers' right to control, reacting to customers' attempt at control, and engaging customers so that they don't try to seek control. Table 2 presents examples of the use of each of these strategies. The strategies presented in Table 2 can be viewed as a continuum of actions by cashiers ranging from passive, through reactive, to proactive. Ignoring a customer means taking no action. Rejecting is somewhat more active; it reflects some active thought on the cashier's part about why the customer does not have a

TABLE 2
Cashiers' Strategies in the Struggle for Control

Strategies	Source of Data		
	Unstructured Observations	Participant Observation	Interviews
Ignoring	Cashiers focus their eyes on the cash register, avoid eye contact with customers if they can.	Trainer told observer: "Sometimes they say really nasty things about how you should do your work. I think you should ignore them because there is no end to such comments."	"When they tell me what to do, like how many earrings to wear, and I don't want to do it, I simply ignore them and don't listen."
Rejecting	No evidence noted.	Cashiers label customers who request continuous monitoring of prices entered "pests" and "naggers."	"He is paying for the merchandise. He is not paying my salary. Why does he think he can tell me what to do?"
Reacting	Customer was angry that cashier had to "waste" time looking for a code, started yelling. Cashier tried to calm him down by saying, "Why do you have to yell? Why do you have to talk like that?"	A customer said, "In America, all the cashiers smile." Cashier replied: "So go to America. What do you want from me?"	"After a customer has rushed me through his purchases I love to sit back, cross my arms, watch him, and let everyone see how he is wasting everyone's time now."
Engaging	Cashier to customer: "Now if you smile, everything will be OK." Cashiers ask customers to put produce on scale.	Cashier keeps customers busy by telling them what to do: "You can take the bread, now pack the oranges, I typed the coffee."	"If I see that they are upset I might sing. I don't sing that well but it makes them laugh and forget they were angry."

right of control. Reacting entails an overt response to a customer's behavior, a response that makes the customer aware that the cashier is annoyed. Finally, engaging is a proactive strategy in which a customer is occupied and thus too busy to demand control.

Ignoring is the most passive strategy. Cashiers can ignore a customer, and frequently do so, by avoiding eye contact. Less than half the cashiers observed during the unstructured observation phase made some form of eye contact with customers. In another study, which included structured observations, 61 percent of the cashiers observed made no eye contact with customers, and an additional 32.8 percent made eye contact only once, for less than one minute (Rafaeli, 1989).

Cashiers may also ignore customers' comments or their attempts to take charge. To illustrate, when customers commented that a cashier should "speed things up" (UO) or "stop talking to your friend" (UO), many cashiers simply continued what they were doing and ignored the comment.

The terminology that cashiers have developed to refer to their interaction with customers is in itself a form of ignoring. As noted earlier, cashiers refer to "passing customers through," an impersonal term that does not acknowledge any individual differences among customers and suggests that a customer is another item to be processed. In actuality, it is the merchandise that cashiers "pass through"; considering a customer as one of the items that is being passed through allows ignoring the customer as a social partner and promotes perceived control of the encounter.

Ignoring is sometimes a necessary strategy for survival; it enables cashiers to concentrate on their work:

I feel really stressed at the register, because I don't really know all the codes yet. And then customers come and tell me what to do and I get into even more stress. The only way I can keep going is by ignoring them and going my own way (I).

Cashiers who ignore customers may justify this behavior to themselves by being slightly more active and rejecting the customers' right of control. This strategy entails the internal justification that "the customer has no business telling me what to do" (I). The transition from ignoring to rejecting is not always obvious and may be known only to the cashier herself. Conceptually, the difference is important, however, both because cashiers make the distinction (e.g., "Before I ignore her, I make sure I am right" [I]) and because rejecting implies a more active and involved employee.

Reacting is a yet more active strategy; a cashier not only thinks that a customer has no right of control but also finds a way to convey that to the customer. The reaction may be verbal but emphasized with blatant nonverbal gestures.

A reaction may simply convey rejection; that was the strategy adopted by the following cashier:

You need to let the customer know that this is how you work and if he doesn't like it he has a problem. If he complains about how I work I don't even bother replying to what he asks. I just say "My name is _____ and you can tell the manager if you don't like me or my work" (I).

It might be noted that this cashier provided legitimacy for her reaction by implying that management will support her behavior.

A reaction may also attempt to convince customers that they are wrong or to dissuade them from an attempt at control. When a customer got upset and started scolding a cashier about not knowing the code for a certain item, she replied,

Why do you have to yell? Why do you have to talk like that? You think I do it on purpose? You think it will help that you yell? It only slows things down and makes them worse! (UO).

Furthermore, a reply may attempt to calm the customer by expressing agree-

ment. To illustrate, during the participant observation one customer got annoyed that the codes on several items were wrong. The cashier replied,

Ok. Yes, you are right. They put codes on the items and don't bother to check. But why are you yelling at me? I didn't put the codes on. I am just trying to help you (PO).

Nonverbal components of a reaction may include sitting with folded arms, glaring, and purposefully dropping merchandise. The first was a favorite strategy of a young and very efficient cashier. When asked how she dealt with difficult customers she replied,

What I love is to finish my work, announce out loud his total, then twiddle my thumbs. It can really embarrass him because everyone can see who is waiting for whom (I).

Reactions may get extreme and may entail raised voices:

I can't stand the customers who bullshit. It must be something about me, maybe because I have all these personal problems and I got divorced. Maybe it is my personality. But I like working fast. And when they move slowly and they try to slow me down it drives me nuts. And I let them know it in the way I do things, like packing their stuff or giving them change. One time I even yelled at a customer.

Engaging is the most proactive strategy a cashier can adopt. It entails keeping customers busy so that they don't bother her. A cashier may engage customers by telling jokes, making small talk, or asking them to do certain things, such as put their vegetables on the scale to be weighed. Engaging the customers requires extensive experience because a cashier needs to do it while she continues with her routine tasks. Engaging is therefore more frequently evident among senior cashiers, as was apparent from observing and talking to both new and experienced cashiers:

My mother is also a cashier, so I am lucky. I learned from her how to handle the job and how to handle customers. But still, I feel I need more experience to really know what to do (cashier with four months tenure, PO).

I always keep the customer busy, it helps me with my work and they are happy. I have been on the job for 16 years. I know it really well (I).

One cashier developed an engaging strategy that appeared very sophisticated. She focused her eyes on the register and only glanced at the strip with the items on it, calling out the items she had entered on the register. She constantly told the customer which items to pack while she worked the register. Her communication with the customer mostly included comments such as "You can take the bread" and "OK, I got the coffee." Occasionally, however, she would remind the customer that she was in control by saying

"No, wait, I haven't entered the ice cream yet" (PO). The last statement reinforced her control because it verified that she was monitoring the customer's behavior; that is, she was the one in charge.

DISCUSSION

The goal of this study was to examine closely the role of service employees. This close examination called for a qualitative, in-depth investigation of one group of employees. Previous research has revealed that organizations invest in efforts to monitor the image set by such employees (Hochschild, 1983; Rafaeli & Sutton, 1987), that organizational sales bear a complex relationship to the behavior of these employees (Sutton & Rafaeli, 1988), and that such employees hold a special relationship to their customers (Adams, 1976; McCallum & Harrison, 1985; Mars & Nicod, 1984; Whyte, 1948). The present study placed in focus a central component of the work of service employees—service encounters (Czepiel et al., 1985).

The study suggests four notions relevant to the research and management of service employees. First, the tight interdependence between cashiers and customers suggests that it is important to focus additional research effort on their encounters, rather than on the participants—clerks or customers—singly. Second, the complexity of the role-sending process that cashiers face suggests that a high degree of tension and strain accompany their service encounters. Third, the contrast between the data collected and other research findings on service suggests several paradoxes about service encounters. And fourth, the dynamics that customers inspire in service encounters suggest several threats to service employees and to service organizations.

Customer influence was instantaneous, continuous, and simultaneous with job performance. Moreover, customer influence stimulates cashiers to react in certain ways. Thus, customers form the transactional environment of these service employees (Marks & Mirvis, 1981; Trist, 1977). In contrast, management, which holds legitimate influence, creates the organizational environment and sets the stage for employee's performance. Management is ultimately responsible for setting up service encounters and also bears responsibility for extreme behaviors. For example, management must get involved if rules are broken or money is stolen. But routine service transactions are affected most by an interplay between service employees and their customers. Their interdependence implies the impropriety of studying service employees independently of their customers.

Other authors have written about interdependence in service encounters (McCallum & Harrison, 1984). What emerged here, however, was that such encounters cannot be understood without a full view of both participants and an emphasis on the interaction between them. Thus, the encounters themselves are important units of analysis in the study of service. Most previous writings have emphasized either employees (cf. Hochschild, 1984) or customers (Desatnick, 1987; Peters & Waterman, 1982).

The findings about interdependence suggest a new research question: How much interpersonal interaction is beneficial and motivating? Job design theoreticians (e.g., Sims, Szilagyi, & Keller, 1976) have argued that the opportunity for interacting with others is a positive job attribute. Indeed, employees may enjoy constant exposure to, and interaction with, clients. As discussed above, however, constant exposure can also be a burden. It is unclear to what extent dealing with others is desirable when the others pose a threat and introduce strain. Too much interaction may not be highly positive and may be a source of frustration.

A second question raised by the findings on interdependence is how customers fit into organizational theory. Customers' role as active participants reinforces the notion that there is room to study the management of customers (Bowen, 1988) because they are actually "partial employees" (Mills & Morris, 1986: 726). Bowen (1988: 2) suggested applying Vroom's (1964) model of employee performance to the assessment of customer performance and noted some questions that such an application raises: Do customers understand how they are expected to perform? Are they able to perform as expected? And are there valued rewards for performing as expected?

The present study also suggests various constraints that introduce tension into service encounters and put a strain on service employees. Four such constraints come to mind: employee's inability to develop a strong social network with co-workers, the limited and constrained nature of relations with customers, the role conflict and ambiguity resulting from a multiply defined role, and the constant struggle for control with customers.

Social frustration was not the focus of the present study. Nonetheless, customers were observed to hinder the development of an informal network among cashiers. Thus, it is likely that cashier's social needs remain frustrated because it is difficult to imagine that the weak set of interpersonal relations evident among the cashiers studied could fulfill social needs.

A second source of strain is the constrained nature of interactions with customers. Cashiers themselves may desire interaction with customers to experience some form of social interaction. (Recall the cashier who said "The only one you can talk to is the customer.") In this case, however, strain may arise as the result of the very short, superficial interactions with a long line of only vaguely familiar people, circumstances that hardly constitute a social network.

Informal interactions between cashiers and customers can create a stressful service encounter if they detract from the cashiers' ability to concentrate on the monetary components of the job, and cause errors. Perhaps customers' suspiciousness about theft is attributable to such swaying of the cashiers' attention. Furthermore, informal interaction with customers may also generate customers' resistance if they view it as a waste of time (Sutton & Rafaeli, 1988).

Service employees may also suffer strain because of the role ambiguity and role conflict associated with multiple role senders (Kahn, Wolfe, Quinn,

& Snoek, 1981; Miles & Perreault, 1976; Parkington, 1979; Shamir, 1980). Customer expectations and comments were sometimes found to run counter to management rules (e.g., there is no need to get a check approved), setting the stage for role conflict. Similarly, there is a fair extent of ambiguity about customer service. The Ten Commandments, the organization's rules for cashiers, did not mention good-quality service, yet customers felt they were paying for good service and conveyed to cashiers that they expected it. The difference in the quality of management's and customers' influence likely exacerbates the strain of the conflict between role senders. It is as if a cashier needs to choose between the immediate, current demands of customers and the formal, but, remote influence of management.

The disagreement about control is also a source of tension in the service encounters observed at the supermarkets. Customers feel they have a right to control these encounters, but cashiers view the encounters as part of their job and engage in a struggle to destroy customer control. In short, the presence of customers constrains the cashiers' interaction with other people and is itself accompanied by a struggle, all of which provides fertile ground for tension and strain.

The tight interdependence between cashiers and customers and the tension inherent in the observed service encounters also suggest several paradoxes about the concept of service. First, it is paradoxical that service employees, who face customer demands all day, actually have very little autonomy to deal with those demands. Second, from the customers' point of view it is paradoxical that the only representative of the organization with whom they interact has so little leeway; the cashiers take the customers' money but can do little more than take money.

Third, from the cashiers' perspective, it is paradoxical that their interpersonal relations at work are so weak and superficial, in spite of their constant exposure to, and interaction with, other people. Of course, the fact that the constant interaction consists of many short interactions with hurried customers who do not view themselves as cashiers' social partners accounts for the paradox; nonetheless, it sheds light on the complexities of service encounters.

Fourth, the strategies developed by cashiers to establish their control of service encounters also pose a paradox. Many of the cashiers observed reinforced a consensus that exists among career counselors, that people who go into service occupations seek and enjoy interpersonal interactions (cf. Osipow, 1973). At the same time, this group of service employees was busy developing strategies to unnerve the people with whom they interacted.

Finally, it is paradoxical that although popular authors concerned with organizational management recommend that organizations, and in particular, service employees, keep "close to the customer" (Peters & Waterman, 1982: 156), in reality, employees often must tune out customer communication in order to pay close attention to the financial details of their work. Worse yet, some service employees intentionally engage their customers in behavior that conforms with their own needs rather than customer needs.

Customers may actually pose a threat to service employees and organizations. Errors and losses may occur when customers divert attention from a cash register or when they try to sway cashiers from complying with organizational rules. Furthermore, cashiers may perceive customers as a threat because they claim to have the right to control the cashiers' work and sometimes use indirect channels to punish cashiers (recall the cashier who was fired because a customer reported that she put money in her purse).

Organizations may also incur indirect costs because of the struggle for control. Obviously, cashiers ignoring customers or reacting unpleasantly to customer demands in order to establish who is in control may have a negative influence on customer satisfaction and on the likelihood that they will return, that is, on "encore gains" (Rafaeli & Sutton, 1987: 32). Similarly, the strains cashiers endure may result in mental and physical health costs to an organization (Beehr & Newman, 1978; Kasl, 1978) as well as turnover and absenteeism costs. It is not unlikely, for example, that the high turnover rate reported in this study is related to the strain that the employees have to endure.

In closing, it is important to note the limitations of the present study. The encounters examined may differ from other service encounters. Supermarket service encounters are relatively short; they do not require the customers' active involvement (customers have to tell waiters what food to bring and cab drivers where to go); they usually do not involve direct monetary payment to a cashier from the customer (no tips); and they aren't that important to the customer.

Moreover, some of the special attributes of supermarket shopping in Israel may have tinted the results. Since customers in Israel usually bag their own groceries, customer involvement may be more active and their influence more immediate than is true in other countries. The lenient attitude in Israel about rudeness, and the poorly developed service concept, may allow cashiers greater freedom in their struggle for control than might be evident elsewhere. Nonetheless, the present study offers a point of departure for further research and theory development on service employees and service encounters.

Finally, the qualitative nature of the present study offers a rich and deep picture of the nature of interactions between clerks and customers in one setting. Such investigations are useful for theory building (Glaser & Strauss, 1967; Mintzberg, 1979). However, more qualitative and quantitative data on supermarkets and on other service settings are essential before researchers will really understand service encounters.

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APPENDIX

Semistructured Interview with Cashiers

- How long have you been working as a cashier? At this store?
 How did you get to be a cashier?
 Who do you talk to while at work? About what? Why?
 Do you know the other cashiers who work with you? What can you tell me about them?
 Do you meet other cashiers or other employees after work? Why?
 Which customers do you like most? Why? How do you deal with them?
 Which customers do you like least? Why? How do you deal with them?
 Can you describe to me an interaction with an "especially good customer?"
 Can you describe to me an interaction with an "especially bad customer?"
 How did you learn how to do your job? How to deal with customers?
 How would you react to the following situations?
1. Customer who said to cashier: "How can you wear three earrings on one ear. That is ridiculous."
 2. Customer who said to cashier, "Will you stop talking and start working! You're wasting everyone's time."
- What else do you have to tell me about the job? About your manager? About the other cashiers? About customers? About anything else?

Semistructured Interview with Customers

- How long have you been shopping at this store?
 Why do you shop here? Do you enjoy it? Why?
 Do you feel you know any of the cashiers? Do you like them?
 What are your perceptions of the cashiers? What do you think about the way they work?
 What would you like to see different in the way they work?
 Can you recall specific examples where you felt especially content about a cashier's work?
 Can you recall specific examples where you were especially annoyed with a cashier?
 Would you like to tell me anything else about cashiers or about the store?
 How old are you?

Basic Rules of Cashier Behavior^{a,b} ("The Ten Commandments")

1. Each cashier should wear a smock and a name tag while at work.
2. It is forbidden while at work to hold by the cash register and/or on the body—money, a wallet, or a personal handbag.
3. It is forbidden to have merchandise in the area of the cash registers and/or to eat and/or drink and/or to smoke and/or to chew gum while on the job.
4. Upon receiving money from a customer, and after giving out change, it is mandatory to immediately put the money or the checks that were received into the register drawer. It is forbidden to receive money from a client before the price of the merchandise has been entered into the register.
IT IS DEFINITELY PROHIBITED to work while the register drawer is open.
5. It is mandatory to ask every person and an employee while he is a customer to display the merchandise he purchased on the table for payment.
6. It is forbidden to let a relative pay for merchandise that he purchased at the

^a In translating this set of instructions from Hebrew into English, I kept the style as close to the original as possible. Thus, problems of clarity or style reflect the originally convoluted presentation of the various rules.

^b As Hebrew is a gender-specific language, these rules are all phrased as addressing only woman cashiers.

register that you are working. Family members will pay for their purchases at a register where the cashier is not a relative.

7. In the case of an error or a return you write a PAY OUT slip (withdraw from the register). The merchandise and the sales slip on which the returned sum appears should be immediately shown to the head cashier and/or the assistant manager and/or the manager in order to get their signed approval.

At the registers where the VOID operates the note should be attached to the PAY OUT slip.

8. PERSONAL SHOPPING IS DONE ONLY AFTER YOU HAVE FINISHED WORKING.

9. It is strictly forbidden for the cashiers to enter their own merchandise.

10. (a) Keeping the area clean is the cashier's responsibility.
(b) Also, when leaving the register for a break or at the end of your work you should remove the key from the register and lock the path (to your register) with a chain.

Anat Rafaeli earned her Ph.D. degree in industrial and organizational psychology at the Ohio State University. She is an assistant professor in organizational behavior at the Graduate School of Business Administration in the Hebrew University of Jerusalem. Her research interests include the unique dynamics of customer service roles and the expression of emotion as part of work roles.

MARKING TIME: PREDICTABLE TRANSITIONS IN TASK GROUPS

CONNIE J. G. GERSICK

University of California, Los Angeles

A new model of group development suggests that groups' attention to time and pacing is an important catalyst of their progress through creative projects. In this laboratory study, groups were videotaped as they produced creative products and then interviewed about replays of selected portions of the tapes. Participants' efforts to pace themselves were explored in depth, with special focus on a key feature of the model, a major transition in groups' approach toward their work at the midpoint of their allotted time. The appropriateness of laboratory simulation for studying midpoint transitions was also assessed. The laboratory results mirrored and extended the field-based model; they showed how groups make deliberate attentional shifts at their temporal midpoints, what differences exist between pacing patterns in the first and second halves of groups' life spans, and what happens when transitions fail. Implications are drawn for theory, practice, and research.

Organizations often rely on small groups when they need an innovation by a deadline. Managers appoint time-limited task forces and committees to deal with novel problems. Businesses designate time-limited project groups to invent new products. Consultants set up time-limited retreats for top-executive teams to design new strategies. How do such groups manage—or fail—to produce unpredictable outcomes within preset schedules? Answering that question requires understanding (1) how groups progress through creative tasks and (2) how groups pace themselves, or fit work into time.

Although there are important literatures bearing on each of those two points separately, almost no research has considered the integrative question of how groups pace themselves through creative work. However, my recent field study of the complete life cycles of special project groups (Gersick, 1988) did explore how teams finished creative products by their deadlines. The study proposed a new model of group development—the path a group takes over its life span toward the accomplishment of its main tasks—that includes the mechanisms and timing of change. It suggested, furthermore, that there are strong, heretofore unrecognized connections between groups'

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pacing efforts and their creative work progress: specifically, that the former can catalyze the latter.

This article discusses a study conducted to follow up on my original research by exploring the cognitive and behavioral links between pacing and development. A laboratory simulation was designed to permit both close observation of groups working and close questioning of participants on how they thought about their work. Using this previously untried design with the field-based model dictated a second purpose for the study: to assess the suitability of laboratory simulation as a research tool for the phenomena of interest.

PREVIOUS RESEARCH

For groups with creative assignments and the responsibility to invent their own work processes, pace is a complex manifestation of group members' speed in managing their own interaction and their interaction with outside stakeholders, solving problems, and discovering and developing new ideas. Understanding what such groups do to accomplish those ends by a deadline overlaps importantly with understanding what they do to create a product at all.

One source of information about these issues is the nascent body of empirical research on the effects of time limits on problem-solving groups. Studies have shown that groups adjust both their rate of work (McGrath & Kelly, 1986) and their style of interaction (Frye & Stritch, 1964; Hermann, 1972; Hoffman & O'Day, 1979; Isenberg, 1981; Pruitt & Drews, 1969) in response to time constraints. For example, McGrath and Kelly found that "the shorter the time limit on [an initial] work period, the higher the rate" at which groups studied in a laboratory solved anagrams (1986: 98). Groups given more time in their first trials not only worked more slowly but showed more attention to interpersonal matters in their interaction patterns (McGrath, forthcoming). Isenberg (1981) found similarly that groups solving a set of memory-related problems both communicated at a faster rate and used more autocratic decision-making processes under high time pressure than they did when time pressure was low. Those findings were based on laboratory groups with sets of similar problems to do in time periods of 3 to 20 minutes. Do the findings extend to groups working through larger, more complex projects?

The literature on group problem solving, or decision development in small groups, should help answer that question. However, although such research has done much to identify the activities groups use to solve problems, it has not attended to pacing. Based on a paradigm of development as an unvarying sequence of stages or activities (Poole, 1983a),¹ it has tradi-

¹ Poole (1983a,b) showed that groups in fact develop in multiple sequences; however, single-sequence models continue to be presented in management texts as factual representations of group development (e.g., Hellriegel, Slocum, & Woodman, 1986; Szilagy & Wallace, 1987; Tosi, Rizzo, & Carroll, 1986).

tionally concentrated on discovering the content and order of those stages. Bales and Strodtbeck's (1951) model, "orientation, evaluation, control," is both classic and indicative. It is implicit in the sequential paradigm that a group advances to a given stage only, and whenever, it completes the prior stage. Perhaps naturally, then, researchers working in this tradition have not investigated the timing or mechanics of how a group moves from one stage to the next, as several previous authors have noted (Hare, 1976; McGrath, 1986; Poole, 1983b; Tuckman, 1965), or how groups fit stages into time limits.

Background: The Field Study

The point of departure for this research was a field study of how task forces—naturally occurring teams brought together specifically to do special projects in limited time periods—actually got work done. I observed eight groups from six different organizations from the start to the finish of their projects. The organizations included a bank, a hospital, a community fund-raising group, a psychiatric treatment center, and two universities. Complete transcripts of groups' meetings and interviews with the members of four groups were analyzed inductively to derive a model of group development.

The findings (Gersick, 1988) showed that teams did not develop in a universal sequence of activities or stages, as traditional models have predicted. Groups' histories varied considerably. However, even though groups' projects ranged from several days to several months in duration, there were striking similarities in the times that groups formed, maintained, and changed their approaches toward their work. Every group exhibited a distinctive approach to its task as soon as it commenced and stayed with that approach through a period of inertia,² which I called *phase 1*, that lasted until precisely halfway through the group's allotted duration. Every group then underwent what I called a *transition*. In a concentrated burst of activity, groups dropped old patterns, reengaged with their outside supervisors, adopted new perspectives on their work, and made dramatic progress. The events that occurred during those transitions shaped, for every group, a new approach to its task. Those new approaches carried groups through a second major phase of inertial activity, called *phase 2*, as they executed plans created at their transition. Groups made one last shift in their behavior patterns just before their deadlines, when they launched into a final burst of activity to finish their work. I called this last phase *completion*.

The findings of the field study seemed to call for a different paradigm of development, not simply a different stage model. The difference between the temporally defined phases that emerged and the traditional activity-defined stages is somewhat analogous to the difference between seeing the structure of football as a set of time-based quarters (phases) with wide variation in the

² This article uses the dictionary definition of inertia as the tendency of a body to remain in a condition: if standing still, to remain so; if moving, to keep moving on the same course.

sequence of plays across games and seeing it as a sequence of different styles of play (stages) that are the same for every game.

Moreover, the linear, additive, building block model of traditional group-development theory was not a good description of the data. The data from my field study suggested that groups' progress was less a succession of stages than a *punctuated equilibrium* (Eldredge & Gould, 1972), or an alternation of inertial movement and radical change. Groups established perceptual and behavior patterns suddenly and worked within those patterns for relatively long periods. They moved ahead by virtue of concentrated bursts of revolutionary change in those patterns. Groups' histories were so varied that progress could not be interpreted as the accomplishment of enough results in one stage to proceed to the next. Instead, the consistent timing of the transition and members' comments in meetings and interviews suggested that major progress occurred when and because members felt particularly strongly that it was time to move ahead.

The most striking single feature of the proposed model, and possibly the most critical for understanding the developmental dynamics of creative invention in groups, is the midpoint transition. In each group, the transition was the moment when group members made fundamental changes in their conceptualization of their own work. They pulled in new ideas and reframed their accrued experience in ways that enabled them to jump forward. Groups did not make such basic changes in their overall direction either before or after these key moments. To the extent that invention means seeing things in a new way, transitions may be at the heart of the invention process.

The Current Study

The punctuated equilibrium model describes some specific earmarks of the transition from phase 1 to phase 2 and specifically proposes that group members' attention to time is the trigger for that transition. The premise of this study was that if group projects could be effectively simulated in a laboratory setting, those earmark events should be as identifiable as they were in the field. By videotaping meetings and replaying those key events (among others) for the groups, participants could be asked to observe their own specific behaviors and to discuss their own understanding of what those behaviors meant, independent of researcher conjecture. Data from meetings and interviews could then be combined to refine and enrich the model of group development and to explore some questions about it through grounded theory (Glaser & Strauss, 1967).

The laboratory process, in which interviews immediately followed brief, videotaped group meetings, was expected to allow participants to recall substantially more about their perceptions and intentions than they could in the field, where projects lasted much longer and interviews were postponed until after meeting observations were complete, to minimize intrusiveness. However, it was not clear whether patterns observed in naturally occurring teams could also arise under artificial conditions and dras-

tically shorter time limits. As McGrath (1987) pointed out, we currently have no theory of how laboratory time translates to real-world time. An important issue for the study, then, was to see if the field-observed patterns appeared at all or appeared in distorted form.

The current study addressed three research questions. The first was if transitions occurred, and if they did, how they worked. Transcript excerpts of meeting behavior itself, alongside members' interpretations of their own actions, are used both to show the extent to which transitions occurred in these laboratory groups and to illustrate precisely why and how groups made transitional changes.

The second question addressed how groups paced themselves throughout their lifespans and what was special about their temporal midpoints. Given the proposed critical role of time in transitions, it is important to understand the temporal context in which groups place their midpoint. Is the special energy associated with it a localized effect, like a reaction to an alarm clock, that can be evoked any time someone inside or outside a group sets off a similar alarm? Or is a midpoint's effect more context-dependent, part of a larger pattern of groups' feelings about how they will use their entire time span?

The third research question was what happened when the midpoint of a group's allotted time passed without the team's completing a minimally successful transition by closing its phase 1 agenda and agreeing on a new basis for phase 2 work. The proposed model suggests that a transition provides a chance for teams to take fresh approaches to their projects by interrupting the inertial movement of phase 1. However, if a group's reaction to time, not the completion of a certain amount of work, triggers transition, the moment will arrive whether or not members are ready to make good use of it. The transition period is an opportunity for change, not a change in and of itself. A team may experience the transition period without being able to change itself successfully or well.

In the field study, none of the teams altered their fundamental approaches after the midpoint transition, and problems left unresolved (or resolved in a dysfunctional way) at transitions persisted throughout phase 2. The midpoint opportunity appears to be fleeting. It is important to explore what happens in teams that do not progress at their midpoints, since the concept of a temporally determined, time-limited chance for major change is so different from the traditional idea that teams progress gradually as they finish the work of each stage.

METHODS

Data Sources

This study was initiated not simply to see whether certain phenomena occurred but also to investigate why and how they occurred. Thorough, in-depth analysis of a small number of teams was therefore chosen over a

large-sample approach. I studied eight groups of M.B.A. students (six groups of three and two groups of four) between December 1985 and May 1986. Subjects were solicited through classroom visits, where the research was explained as a study of how groups get work done. Session dates were set in advance, and a research assistant composed the groups by telephoning volunteers until he found enough who could come for each session. This process yielded groups of people with varying degrees of acquaintanceship with one another, as might normally occur in a work organization. Volunteers knew they would be paid five dollars per hour for participating.

The Simulation

The laboratory sessions were set in a small conference room, with a clock in the middle of one end wall. The clock was already there, so it was not a conspicuous addition to the room. A video camera was set up against the wall opposite the clock and linked to a remote television monitor in the adjoining room. Subjects were requested to arrive on the hour. Once all had arrived, they were given a set of materials about their task and told they would have 15 or 20 minutes to peruse the materials, after which I would convene them for a one-hour meeting to do the task. They were asked not to converse until their meeting was convened.

The materials the subjects received were designed to simulate a real organizational project group in the following respects: The open-ended, creative task required them to construct a concrete product. The subjects had an external client for their product and some information about the client's preferences. They had internal organizational supervisors with whom they could initiate communication. They had a finite but negotiable pool of resources to use and some requirements to meet.

A written task assignment informed them that they were to assume the role of professional advertising writers at a major urban radio station and that their assignment was to come up with the pilot commercial for a prospective client, a well-known airline company. They would have one hour to meet and create a 60-second commercial; no written product was required, but at the end of the hour, a technician would tape them acting out their ad. They were told that several groups would be doing commercials and that the group whose product was judged to be the best according to the client's criteria would receive a bonus of ten dollars per member. The performance and competition were intended to help motivate the students to finish on time and to attend to the requirements and evaluation criteria, given the artificiality of the situation.

Each team's materials included a folder of information about the client, a description of requirements and resources, a list of the costs of a recording session, a statement about how much the ad could cost, and the client's criteria for evaluating the ad. Each group received an audio tape player, four different music tapes, and two sound effects tapes. The budget allowed a group to use only one of the music tapes. Finally, each group had a telephone

and the numbers of two "vice presidents." They could call one if they wanted to argue for a budget increase; they could call the other for advice about the client's probable response to their ideas. A research assistant played the role of the vice presidents.

After subjects had reviewed the material, I repeated their instructions and gave them a chance to ask questions. They were asked to sit at the end of the table facing the camera; they had to turn if they wanted to see the wall clock. Groups were timed so that meetings could start on a half hour.

Meetings were videotaped while I watched on the remote monitor. As each meeting progressed, I made a handwritten transcript and marked the elapsed time and the videotape counter-number in the margin. As I went along, I starred segments I might want to replay for a group. Segments to be replayed were not chosen mechanically or randomly but were selected for their potential to illuminate times, group members' thought processes, and events of theoretical importance.

The model identifies the very beginning and the midpoint of groups' lives as times when groups respectively form and change basic patterns, so I starred those moments. The model postulates that groups' attention to time catalyzes transitions, so moments when members remarked on the time were starred. Since the model proposes that groups make their most significant progress in a concentrated, midpoint burst, I starred moments when the group members strongly urged each other to get moving or appeared to take an especially significant step forward. Finally, the model suggests that groups are particularly receptive to contact with external supervisors at the midpoint and that such contact importantly influences their transitions. Therefore, I starred moments when teams telephoned, or discussed telephoning, a vice president.

When one hour had elapsed, a research assistant entered the conference room and recorded the group's ad on audio tape. He then rewound the videotape. During that time, I selected the starred portions of the written transcripts that appeared most informative or most relevant to the group's progress in light of my overview of the whole meeting. To avoid attributing unwarranted importance to the midpoint, I always selected segments from within the first and second halves of each group's life span, in addition to segments from the beginning and middle of each hour. The number of segments that could be played for each group varied somewhat because of variation in how much group members had to say.

After selecting segments, I entered the room and explained to group members that I was interested in knowing what they were thinking at different times during their meeting, noting that there were no right or wrong answers. I began by asking them what they were thinking immediately before the meeting started. No videotape was played at that time. Next, I played five or six one-to-two minute segments of videotape and asked open-ended questions after each segment, following Ericsson and Simon's (1984) suggestions for protocol analysis. The first question for every segment was

"What were you thinking then?" The last was "Can you recall anything else from that segment?" Somewhat more specific questions were also asked, to clarify and probe what participants said (e.g., "Why did you say [X]?").

Group members were interviewed together. Doing so undoubtedly prevented some participants from speaking freely about some issues, but it elicited a wider range of comments than individual interviews would have, as people reacted to their teammates' views. It also meant that people did not have to wait to be interviewed, thereby insuring immediacy and providing more time to view and discuss the tape.³ Interviews were audio taped.

Written transcripts were made of each group's videotape and interview tape. Although I generally did not record nonverbal behavior, transcripts included notations to show when team members looked at the clock and when they took physical actions related to work, such as taking out paper and pen, picking up or using the music tapes and tape player, using the telephone, or taking out their folders of informational materials.

Analysis

Data reduction. As Miles and Huberman (1984: 21) pointed out, the first step in qualitative analysis is reducing the data into a manageable form. Data reduction aimed (1) to produce a literal condensation of each group's meeting both compact and informative enough to work with and (2) to require a very thorough reading of transcripts, so information inconsistent with the original model could not easily be overlooked.

In reducing the data, I did not follow the approach, taken in many quantitative studies, of placing every statement group members made into a category and then deriving frequencies. Instead, my strategy was to construct a concise, qualitative map of each meeting. The map consisted of a detailed synopsis of a group's discussion on the right half of each page, with code letters on the left half of the page denoting every spot in the meeting where certain types of statements occurred. The codes could be used, for example, to locate every comment a team made about time and pacing, and then the synopsis could be used to see exactly what was said, in what context, and how teammates responded.

Condensation of groups' discussions. For every team, two initial meeting maps were created independently, one by me and one by a research assistant. The research assistant knew the general outline and purpose of the study but had not observed any of the group meetings or interviews or read the interview transcripts. Every turn each group member took to speak was numbered, for cross-referencing of maps and transcripts. Members' exchanges were then abstracted, a few statements at a time, into detailed summaries of each topic of the meeting. For example "22-65: Z and T report ideas they had while reading information materials" indicates that in state-

³ On an initial trial run, both individual and group interviews were conducted; the group interviews were more productive.

ments 22 to 65, members Zoe and Teri⁴ sustained a conversation on the topic described before moving to a new topic. Each summary headed a qualitative segment of a meeting map.

A category system was developed to identify several types of statements to select from the transcript and record—either verbatim or condensed—under the summary headings. The code letters placed in the left margin of the map showed the location of each such statement. Categories were not exhaustive or mutually exclusive. People often tried to accomplish several purposes in the same speaking turn, so many statements were multiply coded.

Since groups' deliberate efforts to move ahead correspond imperfectly with the actual creation of their products, I used two broad classes of categories. The first showed actions group members took to manage the work process. *Action statements* indicated members' attempts to shape their group's progress on its work. There were three types of action statements: In process comments, members made suggestions about how their group should proceed with the work. Process comments were coded with a *P*.

In time-pacing comments, members might mention time directly, by noting what time it was, or how much time had elapsed or was left, or members might try to pace their group by saying when something should be done in reference to the group's allotted time (e.g., "toward the end; before too long"), to how long an action would take, or to finishing on time. Such statements contrast to references to when something should be done according to a logical sequence of subtasks. Time-pacing comments were coded *T*.

In resources-requirements comments, group members drew attention to their group's resources, requirements, or criteria for the task or explicitly tried to shape the product in accordance with the group's resources or requirements. Resources-requirements comments were coded *R*.

There were two types of query comments. The first, coded *Q*, represented a participant's telephone call to one of the vice presidents. The second, coded *q*, coded mentions of telephoning with no call made.

The second class of categories traced contributions to the final product. Using a transcript of the recording of each commercial as a guide, we coded the first appearance of ideas found in the finished product. We could then tell when groups were producing usable materials, whether or not they knew they were doing so, when groups' efforts were directly fruitful, when groups created basic formats to organize ideas, as opposed to scattered details, and when groups were working on different aspects of their products. Coding for statements that contributed to the final product was as follows.

In content statements, group members mentioned selling points to be pushed in the ad or gave ideas for content themes or story lines, the content of dialogue, or information to be presented. Content statements were coded *#c*. Detail statements, coded *#d*, concerned small modifications or fine

⁴ All names that appear in this article are pseudonyms.

points of ad content. Format statements, coded #f, expressed ideas for the basic format of the ad, the vehicle through which the information would be conveyed. Procedure statements, coded #p, gave ideas about the process of acting out the ad and about who would do what for the recording session.

Table 1 shows examples of the coded statements and excerpts from meeting maps.

After creating the initial maps, the research assistant and I met to compare results. We discussed discrepancies until agreement could be reached, referring to the original videotapes if necessary. Cases of unresolved disagreement were noted. This process produced a final map of each meeting.

As a measure of interrater agreement on the initial, uncorrected meeting maps, reliabilities were calculated for each type of action statement coded. On the basis of Rosenthal's (1987) suggestion for handling dummy variables, phi was calculated for each pair of maps and the results averaged. The mean interrater reliability for time-pacing comments was .85 for the eight groups (range = .70–1.00).⁵

Data display and further analysis. The next steps of qualitative analysis are to select and display parts of the reduced data so research questions can be answered (Miles & Huberman, 1984). Again working independently, the research assistant and I used the corrected meeting maps to assess pacing and transition processes.

To gain an overview of team pacing, the interview transcripts were searched for all members' comments about their awareness of time and pacing. Time comments from the meeting transcripts were isolated and all available interview comments about them were displayed below the meeting excerpts.

The last task of the data analysis was to gauge the extent to which each group experienced a transition and to display any interview comments that illuminated the transition process. The first step in this task was to see if meetings broke into major segments, or periods within which activities were similar.⁶ We then determined whether transitions occurred by searching each team's data to see if the following configuration of events, identified as indicating transitions in the field study, occurred within a single ten min-

⁵ Mean interrater reliabilities for other statements coded were .83 for Q and q comments (.95 if one group with only one q comment and zero reliability is excluded); .73 for P comments; and .70 for R comments.

⁶ We used several kinds of data to see if meetings broke into segments. The qualitative summaries of members' exchanges were isolated and scanned to see if a group's miniconversations could be grouped into larger chunks, such as "generating raw materials to present in the ad" or "writing and developing a script." Coded contributions to the final product were similarly isolated and, if possible, grouped; we might note, for instance, that all main elements of ad content (items coded #c) were mentioned by X minutes elapsed time, and only minor details and procedures (items coded #d and #p) were added after X minutes. Next, the process statements (items coded P) were used, along with the meeting segments, to pinpoint any moments when groups made major steps forward in their work, such as consolidating agreement on main selling points or beginning work on the concept for the ad's script.

TABLE 1
Examples of Coded Statements and Meeting Maps^a

a) Coded Statements

Type of Statement	Letter Code	Type of Comment	Examples
Action statements	P	Process	Why don't we just toss out some ideas that we could get into the commercial. Well, do you want to play a tape and see what kind of mood we come up with?
	T	Time-pacing	It seems to me that in the limited time we have (looks at clock), what we might want to do is . . . We still have 32 minutes. I was thinking, kind of shoot for 8:00 and sort of get—get the concept.
	R	Resources-requirements	That's \$200 per thing, so we basically have the choice of one. Let's take one more look over these three (reads client criteria; all check folders).
Contributions to the final product	#c	Content	A rich movie star get[s] into a car . . . chauffeur says "What terminal, sir?" You want to push both [budget and first class].
	#d	Detail	Should the brakes slam or not? . . . They should. Say "Including Europe, Hawaii—"
	#f	Format	What if we had a conversation between two people . . . / You can have two different points of view, the budget point of view and the—
	#p	Procedure	I'll do the second person. Can anyone do that noise? "eerrrrr?" / You're hired.

b) Excerpts from Two Meeting Maps^b

		61–91: Discussion of using music and sound effects
R		61 D: We have to tailor it toward the L.A. market, so I was thinking it should be
#c		Beach Boys type music, as opposed to Mozart.
		62–64: C & K agree it shouldn't be Mozart; you use music to make a point.
#c		67 D: It's nice to have classy music to . . . establish an image, but that's not really
		the point. The point is they're setting up a hub and they want you to fly it.
		530–549: Getting ready and assigning tasks for trial run
P		530 M: Why don't you set up the music?
#p		532–548: Who and when to do "swoosh"; J will swoosh and will time it.
R		541 J: It's 50 bucks there (for sound effect).

^a Slashes divide sequential statements by different team members. Dashes indicate pauses or breaks in speech.

^b Numbers indicate the sequence of statements.

utes of meeting time: (1) a time-pacing comment, (2) a clear effort to conclude or drop phase 1 activity, and (3) a clear effort to take a major step ahead with the work. We also checked the timing of such configurations of events to see if transitions occurred at the midpoint or at some other time in each meeting. Since contact between teams and external stakeholders, usually supervisors, played important roles in the field teams' transitions, we checked the maps to see if members moved to telephone a vice president or referred to the group's requirements or resources during a transition. Finally, the data were consulted to see whether, in fact, there was a jump ahead in task progress during transitions; however, achieved progress was considered a measure of the success of a transition, not an indicator of whether or not one occurred.

Relevant excerpts from meeting transcripts, interview transcripts, and data displays were used to document the results of every search. After the research assistant and I had analyzed each group independently, we discussed and reconciled discrepancies.

RESULTS

The results of the study will be presented in three parts corresponding to the research questions identified in the introductory section. The entire data set was used for all the research questions; however, in order to report every group's transition with both depth and economy, I have divided the transcript data among the three parts.⁷

The first part of this section examines meeting and interview transcripts from four groups to illustrate the extent to which laboratory transitions can mimic those observed in the field. At the same time, these data are analyzed to suggest how the transitional jump in progress works. The second part examines the overall patterns of time-pacing comments from all eight groups' meetings, to explore how groups pace themselves. It then presents data from a different subset of four groups in which off-schedule attempts to spark transitions occurred, to probe the special role of the temporal midpoint. In the third part, the one group in the study that experienced serious problems with its work is examined for the lessons it offers about what happens when the midpoint passes without a team's completing a successful transition.

Transitions in the Laboratory

Did midpoint transitions occur in this laboratory setting? If they did, how did they work? A key hypothesis generated by the field study was that groups take the major steps in their work suddenly, when and because mem-

⁷ The one group that did not finish its task provides unique data about a problematic transition and is therefore presented in the third part of the Results section. Four groups that included members who made off-schedule attempts to precipitate transitions are presented in the second part, since they offer some unique data about the timing of transitions. I chose the three remaining groups, along with one from the second part, to present in the first part.

bers feel it is time to do so, not gradually, as they complete a prerequisite amount of work. All eight groups studied exhibited such time-linked transitions, displaying explicit attention to time, accompanied by efforts to conclude an initial phase of the work and efforts to shift ahead. In six of the groups, transitions occurred at the midpoint of the groups' allotted time. In group 5, where one member's watch was slow and another overestimated the time limit, the transition was slightly late, and in group 8, it was early. Groups' behavior with regard to outside requirements and resources was less similar to the field results than was behavior regarding transitions. The four teams whose meeting and interview transcripts are excerpted in this subsection provide succinct, representative illustrations of the mechanics of midpoint transitions and show some important variation in how the eight lab teams worked.

Attention to time. In all eight groups, members made time-related comments at their midpoints, varying from a brief remark to a careful evaluation of the group's time use (see Table 3). Table 2 shows details of those comments. The video dialogues in this table are from portions of group meetings that were played back for participants. The interview excerpts below them are members' comments on the video segments. In group 3, for example, one member simply noted "we only have a half hour more," whereas group 2's members interrupted their work on the product to assess how they were "doing for time" and to plan how to pace their work over the remaining half hour. In groups 1 and 4, members voiced more overt concerns about finishing on time: "Once it passes the halfway point, that's when the panic sets in" (1v: 322).⁸ "You know, if we had three or four hours . . . that's one of the things we've got to think about here" (4v: 255).

This midpoint attention to time is interesting per se, but the important theoretical question is whether or not it affected the development of groups' work. Table 2 documents members' explicit midpoint decisions that they should shift gears because of the time. When asked "[Is there] anything you can remember about that part of the tape?" Pat, in group 1 (1i: 135–139), described thinking that because it was "the halfway point . . . we did . . . have to get down to business now." In group 2, Dan and Nick stated point-blank that "it was time to move on with the task" (2i: 99; 100) and Karl explained how he judged that it was "important to start writing" so the group would have time to make changes later.

Other comments offer similar evidence and suggest further that time overrides considerations about the amount of work that's been done as a stimulus to move ahead. In group 3 (3i: 92), Rob noted that even though, in task terms, he felt they didn't "have enough written down" yet to move forward, he still thought "we better get something done on this thing, and go with it." Finally, Ben's statement (4i: 106) in group 4 shows his assessment

⁸ In the notation "1v: 322," 1 identifies the group, "v" indicates the quote is from the video transcript, and 322 is the statement's number in the original transcript; in other notations, "i" means a quote is from an interview transcript.

TABLE 2
Time-linked Efforts to Move Ahead at the Midpoint in Four Groups

Group	Description of Excerpt	Statements ^a
1	Meeting videotape, 30 minutes elapsed	<p>316 May: Do we care that they carry Columbian coffee instead of instant?</p> <p>319 May: Alright, I think we're running out of time.</p> <p>320 Jon: (looks at clock) We have 28 minutes.</p> <p>322 Pat: Uh oh. Once it passes the halfway point, that's when the panic sets in.</p> <p>326 May: OK so we've got this music playing and we're going to open with the business scenario of high pressure, fast pace.</p> <p>327 May: So what's our opening line?</p> <p>328 Pat: Something like (suggests line).</p> <p>333 Jon: I don't know . . . This is supposed to be creative . . . and probably we're not doing it. (Talks at length; outlines whole ad, including format, music, sound effects.)</p>
1	Group interview	<p>135-139 Pat: I remember thinking . . . it was now, indeed, the halfway point. . . . There was no question in my mind that we were going to get it done. But I was recognizing your concern . . . that you were—watching the clock and that . . . we did . . . have to get down to business now.</p> <p>140 May: When I [mentioned the coffee] I was trying to raise issues so we could say "no, that isn't important, let's get on with more important issues"—like trying to stimulate some kind of—coming to a conclusion. . . .</p> <p>144 May: I was anxious to get something down on paper in the form of a script. And I liked the fact that he had an idea and we were going with it.</p> <p>147 Pat: Jon was wrapping up and providing a condensed version, basically, of our last 20 minutes and what we wanted to do, with some of his own viewpoints and interpretations.</p>
2	Meeting videotape, 30 minutes elapsed	<p>321 Nick: How are we doing for time? (All look at clock; it is exactly half past.)</p> <p>323 Karl: We're doing OK. We have till what—9:00?</p> <p>325 Karl: I'm just watching the time, we're doing OK.</p> <p>326 Nick: I think we should keep a 10-minute margin. But we should be through by [8:50]. There'll be lots of copy and we'll have a—</p> <p>327 Clark: Practice. Yeah. We've got to hit (summarizes 3 issues to cover).</p>
	31 minutes elapsed	<p>357 Dan: We can start putting this all together. We have (describes how commercial would be).</p>
2	Group interview	<p>97 Clark: I thought we should start writing then. We knew the points we were going to put in, so let's start . . . At that point, it seemed like we had a lot of time—</p> <p>99 Dan: . . . It was time to move on with the task. . . . And Clark was—sort of summarizing and re-focusing us to continue to move ahead, and no longer formulate ideas, but transform it into the ad.</p> <p>100 Nick: I thought it was time to get moving and just get it written. Whether we get it right or not, we want to get it written.</p> <p>102 Karl: I was obviously concerned about the time. . . . I knew</p>

TABLE 2 (continued)

Group	Description of Excerpt	Statements ^a
3	Meeting videotape, 28 minutes elapsed	we could make a . . . change or leave something and then come back. So it seemed important to start writing. Starting thinking more about a script rather than just ideas. . . .
		256 Ann: OK, should we listen to some of this [music] or just—?
		257 Rob: (Suggests playing Beethoven tape.)
3	30 minutes elapsed	258 Ann: Well, maybe that would class up the image. I mean we only have a half hour more (R looks at clock) but let's class up the image!
		264 Deb: How 'bout this?! As it goes "ba ba ba bum," say "Brussels!"
		280–292 Ann: (Plays rock tape, ad libs to music, as in final product.)
3	Group interview	288 Deb: Oh! That was perfect! Right like you said that!
		78 Ann: We were really disjointed. And that gave us something real concrete . . . if we can't agree on the concepts, can't agree on the text, if we don't have a niche marketplace, let's at least listen to the music.
		81 Deb: . . . it was the first time we started to put on thinking caps as about not what we wanted to say, but how we wanted to say it, and it changed the direction of the conversation. From then on—from that point on, I started to get a clearer and clearer idea what I wanted this commercial to be.
4	Meeting videotape, 30 minutes elapsed	92 Rob: I started having a lot of fun as soon as P started playing the music . . . I also remember thinking . . . it's too soon to do that because we don't have enough written down about what the message would be . . . [but I thought] we better get something done on this thing, and go with it.
		206 Ben: We still have 32 minutes. [Want to] play one [tape] and see what kind of mood we come up with?
		207 Ian: (Suggests idea using Beethoven tape.)
4	31 minutes elapsed	224 Ian: We're going to have to script this. . . .
		225 Ben: . . . alright, let's go. You know, if we had three or four hours, we [could try other things]—that's one of the things we've got to think about here. I like the Beethoven idea and being on a time constraint, I feel like, let's go with that idea and build from there.
		236 Ian: Or you know how we can do it? We can have a dialogue between two people? And have one guy say "Joe, I'd love to fly—"
4	Group interview	237 Ben: (joining in) "It's just so expensive."
		238 Ian: And he goes "Guess what? Da, da, da, da. People Express!"
		239 Ben: Oh, that could be great!
4	Group interview	61 Ian: (earlier in interview) I was . . . wondering who was going to come up with the big concept of the commercial. . . . Like my roommate . . . comes up with the big idea and I throw all the jokes inside. . . . And I could feel the shift at one point, where . . . our ideas were a lot more creative, whereas before they were just really analytical.
		100 Ben: This was . . . the beginning stage of coming up with the

TABLE 2 (continued)

Group	Description of Excerpt	Statements ^a
		final product more so than the facts. We got the facts . . . and we were in the state now where we were throwing out ideas. . . . It was a real give and take . . . the meat of the creative process.
105	Fred:	Well, I was watching my watch, that's why—
106	Ben:	That's what pulled it together is time. . . . You always could make it a little bit better. . . . But time pulls you in a sense of "well, that's one limitation we can't get around here." And so whatever you got, quit talking about it, just get it on there.

^a Initial numbers indicate the sequence of statements.

that the group could have continued their current activity indefinitely but that they simply had to move forward, "Time pulls you . . . that's one limitation we can't get around here. And so whatever you got, quit talking about it, just get it on there."

Efforts to conclude an initial phase of the work and shift ahead. The hypothesized model proposes that at the transition, groups are poised for a major turning point in their development. The field study suggested that, at the midpoint, groups stop the activity that has dominated the first half of their time and, if their transitions are successful, quickly move into a new, qualitatively different phase of work activity.

Table 2 documents group members' discussion of their efforts to do that. In groups 1 and 2, members' remarks suggest that they brought an initial phase of activity to an abrupt close by summarizing it and then shifted their attention ahead to the next step in a deliberate fashion. In group 1's meeting, May made two consecutive statements, first summarizing the group's general idea of what the product would be like (1v: 326) and then immediately prodding the group to move on from there: "So what's our opening line?" May's interview mirrors this pattern when she says she was trying to stimulate the group's "coming to a conclusion" (1i: 140), then adds that she was "anxious to get . . . a script." Pat describes Jon's long statement in the meeting as a "wrapping up . . . of our last 20 minutes and what we wanted to do" (1i: 147).

In group 2, Clark summarized the issues the product should cover (2v: 327) and, in the interview, Dan said Clark was "summarizing and refocusing us to continue to move ahead—and no longer formulate ideas, but transform it into the ad." Dan's statement that "we can start putting this all together" (2v: 357) launched group 2 into the work of transforming "ideas into the ad" just 60 seconds after the group's midpoint.

The transcripts for groups 3 and 4 also indicate that group members saw this part of the meeting as a turning point between two major work segments: "... it was the first time we started to [think] about not what we wanted to say but how we wanted to say it, and it changed the direction of the

conversation" (3i: 81). In group 4, Ben described the midpoint as "the beginning stage of coming up with the final product more so than the facts . . . the meat of the creative process" (4i: 100); Ian said he "could feel the shift at one point, where our ideas were a lot more creative, whereas before they were just really analytical" (4i: 61).

Groups 3 and 4 were not as far along in their work as groups 1 and 2 when they reached the midpoint, and the way they accomplished the jump ahead was somewhat different. For groups 1 and 2, the transition was a little like stamping "complete" on one subtask and turning to the in-basket for the next subtask. Groups 3 and 4 made the shift less tidily, but equally deliberately, by reaching out for a new source of inspiration—something to catalyze their progress. In these teams, the catalyst was the music tapes they had been given to work with: ". . . if we can't agree on the concepts, can't agree on the text, if we don't have a niche marketplace, let's at least listen to the music" (3i: 78). "[Do you want to] play one and see what kind of mood we come up with?" (4v: 206). Groups 3 and 4 each came up with "the big concept of the commercial" (4i: 61) within two minutes of their midpoints (see 3v: 280–288 and 4v: 236–239).

Agreement on a basis for the work. In the field study, the transition was a moment when successful groups agreed on some concrete plan or goal that formed the basis for moving forward with their projects. In doing so, they eliminated competing possibilities and gave themselves a platform from which to construct further work. There was evidence that the laboratory groups also did this.

In groups 1 and 2, members' summary statements do more than bring an end to an initial phase of activity: they close off options ("and no longer formulate ideas" [2i: 99]) and provide a point of focus for the next step ("So . . . we're going to open with the business scenario . . ." [1v: 326]). Comments from groups 3 and 4, who did not begin their transitions with summaries of the work they had done, show that they also wanted to zero in on a focused plan. Ann's comment (3i: 78) in group 3 indicated that she pulled out the music tapes specifically because she was looking for something "concrete" on which a "disjointed" group could agree. Group 4 essentially pounced on one idea as soon as members came up with something appealing: "I like the Beethoven idea and being on a time constraint, I feel like, let's go with that idea and build from there" (4v: 225).

Attention to outside stakeholders. The field study identified the midpoint as a time when teams were especially influenceable by and interested in contact with outside stakeholders. In some cases, midpoint contact helped teams make choices and move ahead, and often teams' midpoint matching of their product with outside requirements and resources was critical to project success. Four of the eight field teams had special midpoint meetings with outside stakeholders,⁹ two initiated by the team, one by the supervisor, and one mutually initiated by the team and outside stakeholders.

⁹ One of the field team's meetings with an outside supervisor was announced at the midpoint and carried out just afterward.

In the laboratory study, several teams did check requirements and resources at the time of their transition, but requirements were more likely to enter teams' discussions throughout their first half hours. Of the seven teams whose members raised the idea of calling their vice president, four teams made calls, about the same proportion that initiated direct contact in the field study. No calls were made during transitions, however. Almost all telephone activity occurred during the first 27 minutes of teams' hours, in which seven of the eight calls and 12 of the 14 comments about calling occurred. Half of that activity occurred between 22 and 27 minutes elapsed time (5 calls, 4 comments).

The sharp drop in calls after the 27-minute point and the clustering of calls slightly before the midpoint are interesting indexes of differences in teams' activities between phases 1 and 2. The calls made between the 22nd and 27th minutes may reflect teams' running low on patience with phase 1 materials. Furthermore, comments made after 21 minutes had passed dealt mainly with participants' desire for information to help them make choices, whereas earlier phone calls and comments about phone calls more often dealt with the clarification of facts.¹⁰ The laboratory teams were therefore somewhat similar to the field teams that regarded supervisors as potential sources of fresh input to catalyze their decision making. But the lab groups showed virtually no concern about their supervisors' evaluation of them and few expectations that they would get help over the telephone, beyond such simple assistance as a description of the radio audience. In those respects, the lab groups were very different from the field groups.

In summary, the evidence from these experimental groups suggests that it is possible to observe the central features of a transition in a laboratory. Groups did make sudden, time-linked shifts in their work at the midpoint of their lifespans. Members' comments suggest that they chose halfway as a point when they ought to move forward with their work, whatever the amount of material they had generated so far or could potentially generate. Members' deliberate shifts in attention appeared to be central to the mechanics of the laboratory transitions. Members either declared their first phase of activity complete and turned to the next phase, or they sought out a fresh source of ideas. In each team, members moved to narrow down their work by trying to select a concrete base on which to construct their product. The one area that did not match the field results was teams' contact with outside supervisors.

Pacing and the Midpoint

How do groups pace themselves through time, and how is the midpoint special? An overview of all the time-pacing comments from all eight groups shows when and how often group members voiced concern with pacing. It shows the special status of the midpoint and suggests there may be differ-

¹⁰ A summary of Q and q comments is available from the author.

was one segment, from 28 to 31 minutes elapsed time, during which a time comment occurred in every group. Comments were made at precisely 30 minutes in six groups; in the remaining two groups, one member commented on the "halfway point" at 31 minutes elapsed time, and one remarked that there was "a half hour" left at 28 minutes elapsed time. There was no other 3-minute segment when more than four groups made time comments until the last 8 minutes. There was no other segment when more than five groups made time comments. Halfway emerges as the most likely moment at which at least one group member will call attention to time or pacing.

It is also evident from Figure 1 and Table 3 that members made several comments about time and pacing in every group and that those comments were not evenly distributed across the hour. Clearly, groups do not universally wait for the midpoint to begin pacing themselves; at least in some cases, they start talking about how fast to work from the start. As Table 3 shows, the first four time comments, made at 4 and 5 minutes elapsed time, all call attention to the total time limit, as if to set the group's initial pace at a fast enough rate: "Come on, we only have an hour!" Two of the other pre-midpoint time comments simply check the time, without calling for any action.

A third pattern evident in Figure 1 is the difference in the frequency of comments in the first and last 25 minutes of the groups' meetings. The midpoint appeared to divide groups' hours into two parts during which members turned their attention to time at different rates. Two groups did not mention time at all until the midpoint. Across groups, a total of 12 time comments were made in the first 25 minutes. During the last 25 minutes, 35 comments—almost three times as many—were made. This skewed distribution occurred in six of the groups. Evidently, the less time a group has left, the more frequently pacing activity occurs, with a jump in the rate at the midpoint.

Along with differences in frequency, there is a difference in the placement of comments made during the first and second halves of the meetings. Comments in the first 25 minutes cluster near 5 minutes, 15 minutes, and 20 minutes, whereas comments in the last half occur at less orderly intervals. The neat clusters of time comments suggest the possibility that for the first half of their time, these students were mechanically pacing themselves against temporal milestones that were relatively independent of the amount of work they had done—the midpoint being by far the most important. In this portion of the groups' life spans, time limits were much clearer than the amount of work they had to do, given a novel task and great latitude to vary the ambitiousness of their plans. In contrast, the varied spacing of time comments in the second half of groups' meetings may indicate increased clarity about work plans. Not only were groups hurrying themselves more as the deadline approached, but their struggles to fit work into time may have become more particularistic as they dealt with more concrete demands from the specific plans they had generated.

The importance of the midpoint. All but one group (group 8, whose

TABLE 3
An Overview of Time and Pacing Comments in the Eight Groups

Time Period	Minutes Elapsed	Group	Statements
0–28 minutes ^a	4	3	Maybe we should just start making some basics because actually I have a feeling an hour is going to go really fast.
	4	8	It seems to me that in the limited time we have (looks at clock) what we might want to do is start by thinking what type of ad do we want to do.
	5	5	Maybe what we should do, considering the time constraint, is make a list. . . .
	5	1	(teammates are joking) Come on, we only have one hour!
	14	5	How are we doing on time? OK (looks at watch).
	15	3	We should get a concept down real fast, because we need to—see if it's . . . too boring, whatever.
	15	8	We should really start writing this (looks at clock and watch). We have 45 minutes.
	19	1	How much more time do we have? / Plenty of time. / 40 minutes. We can rattle off 40 commercials. / When did we start? / 9:30 / OK.
	19	8	OK, I think we ought to start writing some dialogue (looks at clock). You know . . . as far as the other end, I'm thinking about the production end of it.
	20	8	I think all we have to do just right now (looks at watch) is pick one or the other.
	20	6	(looks at clock) You know, I think we should stop at—like—I don't wanna say stop, but we should get our ideas down. It's gonna take a while to write it out. That scares me, 'cause that takes a long time. / Yeah—I was thinking, kind of shoot for 8:00 and sort of—Get the concept [first].
	22	7	(one, then all look at clock) We have 20 minutes gone. / Should we brainstorm, just ideas for the ad—?
	28–32 minutes—the midpoint	3	We only have a half hour more—but let's class up the image!
	30	2	How are we doing for time? / (all look at clock) / We're doing OK. / I think we should keep a ten minute margin. But we should be through by [8:50]. There'll be lots of copy and we'll have a— / Practice.
	30	4	Do you want to play one again? (looks at clock) We still have 32 minutes. Play one and see what kind of mood we come up with?
	30	5	Maybe we should start on the script pretty soon.
	30	6	The real time is going to be spent writing up (looks at clock) and maybe we should do this separately.
	32	6	[Would anyone] feel good about writing the other section or should we all work on it together? I'm just thinking about time (looks at clock).
	30	7	Alright. (looks at clock) It's 8:00. We've got half an hour to put this together. . . . Are we ready to move on to concepts for the one-minute spot?

TABLE 3 (continued)

Time Period	Minutes Elapsed	Group	Statements
35-48 minutes	30	8	We have to decide right now . . . either do something . . . realistic or make it funny . . . and we don't have an hour to make up a whole jingle.
	31	1	Alright, we're running out of time. / We have 28 minutes. / Uh oh. Once it passes the halfway point, that's when the panic sets in.
	35	1	Let's run through the whole idea . . . and if we don't like it, we [could] can it and we still have 20 minutes to—
	35	3	We have 25 minutes! / OK let's start writing some script. Let's try this music. If it doesn't work, we only have 25 more minutes.
	35	6	I guess that [point's] nothing we should worry about too long. We don't have the time.
	37	5	We better start writing the script, since we only have 20 minutes left. / We've got a half hour! / Really? (looks at watch) I have 20 minutes . . . less than 20 minutes (looks at clock). / Really? When did we start? / 25 after.
	37	3	Ready for some script? We have to time it. We have . . . 20 minutes to write a whole script!
	40	2	We better get some words down. We've got—ten minutes to get some words!
	40	4	OK, we've got to nail it down (looks at watch) or we're not going to be ready. / (looks at watch) We've got 20 minutes. / We've got to get a script. OK, what do we have the first guy say?
	43	3	We have about 10 minutes to finish this.
	43	4	We're down to 15 minutes! . . . but we don't have all week to do this. We just need to get something down now.
	43	6	We need to write this down—fast, too (looks at clock).
	43	7	I think we need to (looks at clock) get down and write something.
	44	7	What would be the jingle? We really have to decide on things now, otherwise—
	46	4	We've got 15 minutes here. We'll just go with it. It's not to perfection.
	47	5	I think we have to can quality control because we've only got 10 minutes left and we've only got about 3 lines written (suggests they divide the labor).
50-60 minutes	47	8	(looks at clock) I think we're in good shape.
	48	4	Eleven minutes. Maybe we ought to go back to the thing on vacation. / Start working on it because we're running out of time. Just have a 15-second dialogue that gets the facts out, OK?
	50	1	We like anything at this point in time.
	50	7	(responding to suggestion) Well we don't have time (looks at clock) I think we really have got to get it together.

TABLE 3 (continued)

Time Period	Minutes Elapsed	Group	Statements
50–60 minutes (continued)	52	7	We've got to get it done in 5 minutes. And we've got to have time to practice once, at least.
	52	3	I'm at the point I don't care what we do. We only have like 3 minutes to finish this and practice once. / We have 7 minutes. / But it'll take 5 to [practice & revise]. / Well, we better do something.
	52	2	We're closing in on the last 10 minutes. / I know, we've got to get going here.
	53	1	I think we should try a dry run in about 2 minutes.
	54	2	It doesn't matter. Not right now (re refining product).
	54	6	We need to run through this . . . the time is really a problem.
	55	6	Is that enough help? / Gotta be, cause . . . we have about three minutes.
	55	4	We've only got a minute here . . . OK we've got three . . . four minutes here (looks at clock). OK we've got (summarizes script). Now we've got to . . . / Alright, we have to think about (X). We're looking at 2½ minutes!
	55	8	OK, now run through it one more time, and then pick out the music, because we've got 3 minutes!
	55	3	How are we doing on time? / We have 4 minutes left.
	56	3	We . . . have time to go through it one time. Let's go through it once. Who wants to do what?
	56	1	Why don't we play through it once. / It's not long enough yet. / Well, put it this way. We have 3½ minutes to go.
	57	4	Let's give it one try. We've got a minute and a half.
	58	8	Final rehearsal! We have—2 minutes left! (looks at clock)
	58	2	There's no time to talk about price! (as topic in ad)
	59	4	It's great! We still have not quite figured out the music here. We've got 30 more seconds! (laughs)
	59	7	Call . . . the marketing manager. . . . Tell him we need a 15-minute extension.

* There were no time comments during the following: 6–13 minutes, 16–18 minutes, and 23–27 minutes.

transition is explained below) waited until the midpoint to make a major transition in their work, even though members of six groups began commenting about time before then. It appears that early efforts to pace a group don't usually push it into a transition. For the most part, teammates appeared to regard pre-midpoint times as early, and post-midpoint times as late, for making the transitional shifts into a qualitatively different type of work activity.

Table 4 provides evidence of this awareness with excerpts from three teams who talked about pre-midpoint pacing in their interviews. The first

TABLE 4
"Off-Schedule" Pacing Comments in Three Groups

Group	Description of Excerpt	Statements
1	Meeting videotape, 19 minutes elapsed	185 May: How much time do we have? 186 Pat: (not looking up) Plenty of time. 187 Jon: (looks at clock) 40 minutes. We can rattle off 40 commercials. 188 May: When did we start? (looks at clock)
1	Group interview	86 May: I got a little bit impatient. . . . And I really needed to be more aware of time. . . . That's when Pat said "Oh, we have forty more minutes! Plenty of time!" And I think later on, we referred to time . . . she's like "OK, now we've reached the halfway point. Now we're really in trouble!"
5	Meeting videotape, 30 minutes elapsed	251 Meg: (interrupts talk about number of flight departures) Well, you'd have to add them up. Maybe we should start on the script pretty soon.
5	Group interview	112 Meg: Feeling time pressure . . . I could envision how much work we had left to do. And even though we had about 25 minutes left, I really felt we had to start then. 113 Cora: I felt . . . it would be a pretty good idea to start. We could also wait for a little. I wasn't feeling it was mandatory to start right then. 114 Sam: It turns out I had thought we actually had a few more minutes than we did at that point. So I could see the value of starting early but I didn't probably feel as pressured as Meg did, mistakenly so. It turns out, when I finally got on the right time schedule, I started to get a little desperate.
6	Meeting video, 20 minutes elapsed	200 Teri: (looks at clock) You know, I think we should stop at like—I don't wanna say stop, but we should get our ideas down. It's gonna take a while to write it out. That scares me, cause that takes a long time. 201 Sid: Yeah—I was thinking, kind of shoot for 8:00 and sort of—get the concept [first].
6	Group interview	80 Zoe: I had been thinking that we should set up a time table. And then Teri said it. And then—I was also thinking—if I had to write the ad by myself, I could probably do it but I wasn't sure we could get it all together by the time limit. 82 Sid: I had an image that we would form the idea completely and then—execute. . . . At that point, I was hoping to stall a move to start working on it too soon and thereby sort of freeze where we were because I felt we were really just . . . spinning off a lot of ideas . . . I felt as we got a really good idea [we] could have time to work on it. We would be able to do it really fast. Q: You mentioned 8:00. How did that figure in? 88 Sid: That was halfway between 7:30 and 8:30. (They laugh) No, and I thought if we waited until 8:00, that would still give us half an hour, which ought to be enough to execute it. And that way, we sort of set a number . . . we could work toward it and then at that moment, we would shift gears and go into the execution.

excerpt shows one participant's observation that one of her teammates went from an assessment that the group had "plenty of time" to the statement "OK, now we've reached the halfway point. Now we're really in trouble!" in just 10 minutes.

Group 5 illustrates the importance as a catalyst of group members' perception that they are at the midpoint of their time—as opposed to the absolute number of minutes they've spent—and it indicates the need for team agreement that it is time to move. In group 5, Meg was clearly "feeling time pressure" at the midpoint, but Sam, whose watch was wrong, thought it was "[too] early . . . mistakenly so." Cora, who said in the interview she had thought they had an hour and a half to work, was also feeling no need "to start right then." Seven minutes later, Meg mentioned the time explicitly, and the group clarified its schedule. The following is an excerpt from group 5's video transcript, at 37 minutes elapsed time.

- 302 Meg: Well, we better start writing the script, since we only have 20 minutes left.
303 Sam: (jerks up head, picks up watch from table) We've got a half hour.
304 Meg: Really? (leans forward, looks at watch on table) I have 20 minutes . . . (looks at wall clock).

At this point, Sam apparently thought it was "late" to be moving into script writing, judging from his comment that "When I finally got on the right time schedule, I started to get a little desperate."

Group 6 provides a final illustration of a team's reluctance to make a transition before its midpoint. The following interview excerpts show the reaction of members of group 6 to a video segment from 15 minutes into the meeting, when the group was discussing story ideas.

- 56 Teri: . . . we came back and forth to that same concept a couple of times. . . . there was a long period when my thoughts were pretty much the same. It fit in there.
66 Sid: I actually remember at that point . . . I wondered whether I was sort of stirring the pot about the idea in order not to have to cope with—
67 Teri: The work of it.
68 Sid: (agreeing)—who had to do it, because I was really fearful of that—having to actually execute this. So I . . . may have been hoping that we can . . . extend the concept of talking about the idea so as to not have to do it.

At the 15-minute mark, group 6 was circling around the same ideas without doing much to move on. Progress was not simply a matter of striding ahead as soon as a group had enough raw material.

Table 4 shows the group 5 minutes later, more restless about time—and it shows Sid's conscious plan to "shoot for" a transition at the midpoint. When Teri asked the group to plan its time use, Sid "stall[ed] a move to start working on it *too soon*" (my emphasis), this time because he felt the group

was working well and he didn't want to forgo the possibility of coming up with "a really good idea" (6i: 82). He planned waiting until 8:00, because that "was halfway between 7:30 and 8:30." He explained his plan as setting a number to work toward, "and then at that moment, we would shift gears and go into the execution."

Group 8 was the only one that made a major shift before the midpoint. One of the group's members started the meeting with a clear structure for pacing the group's work. He said at the very beginning of the interview that he "wanted to start right into it" and that he was "trying . . . to formulate things in a time structure." He added, "You know, for the hour, I was thinking, OK, we can spend the first half hour deciding what we want, the next 15 minutes writing, the next 15 minutes refining it" (my emphasis).

His teammates did use this three-part structure, except they started into their second segment 7 minutes early. They took only 23 minutes to outline all the elements for their ad, then created a complete first-draft script between 23 and 42 minutes elapsed time. They spent the last third of their time rehearsing and revising the ad. The video transcripts clearly indicate that group 8's move ahead was time-linked, like the other groups' transitions. The following statements are from 15 and 20 minutes elapsed time, respectively.

216 Ned: So, we should really start writing this. We have 45 minutes. (Group does not write, but develops two alternative story lines.)

266 Ned: I think all we have to do just right now (looks at watch) is pick one [story line] or the other. (3 minutes later, the group settles on one choice and starts writing.)

The major difference between this team and the others was that one member prodded the group to start ahead of schedule, and his teammates went along.

There seem to have been several contributors to group 8's early progress: expertise, agreement, and a clear work schedule. One group member with entertainment experience was ready immediately with script scenarios. Members agreed quickly on content for the ad. Perhaps most important, Ned's teammates agreed to let him pace their work. In their interview, Joan said: "[Kathy] and I pretty much acquiesced to all of—everything [Ned] said about budget and time." Since Ned had explicitly structured both the time and the work into segments as the meeting began, and Joan had had experience with the task, they may have been more likely than other teams to declare or recognize a part of the work as done and move to the next step.

In summary, the overall distribution of time comments and transcript evidence about off-schedule pacing attempts suggest the following: (1) Pacing occurs in every team, but individuals vary in their patterns of attention to time. At least some team members begin consciously pacing themselves from the start of work. (2) Some teammate convergence, or agreement that

"the time is right," is necessary to precipitate a transition. (3) Under some circumstances, team members may agree that it is time for a transition before they are halfway through, but in most cases, (4) the midpoint is the most likely time at which team members will feel both ready and willing to declare that it is time to move ahead with the work.

Unsuccessful Transitions

What happens when a midpoint passes without a successful transition? The serendipitous difficulties of one of the laboratory teams, group 7, allow the exploration of this question. Table 5 begins with excerpts from both the midpoint and later in group 7's meeting.

Table 5 (7v: 268 and 272) shows that this group started its transition the same way as the other groups in the study. Pete noted the time, stressing that there was half an hour left. He asked the group to turn to its next subtask: "Are we ready to move on to concepts for the spot?" Getting no strong response, he backtracked and summarized what he thought the group had agreed on so far (7v: 274).

The interview indicates that his teammates felt the same time pressure and also felt that it was time to move on. However, members said they did not advance to the next step because they were unable to stop "discussion mode" (7i: 157–175 and 191). The team could not close debate and agree on a basis for phase 2 work, as statements 303 and 375 in the video transcript indicate. One member expressly described the group's trouble as a faulty transition: "Our problem was going from an idea phase to a paper phase . . . that transition was really bad. We should have said 'OK, [this is it]' . . . We had no framework to fit the ideas into."

Video transcript lines 374–376 show how group 7 finally did start on a script. With only 10 minutes left, Pete simply stopped further discussion and started dictating. Until then, the team still had not agreed on a common basis for production. Andy, commenting in his interview on video excerpt 374, said, "Just before this, basically we had nothing. We each had ideas, but . . . our ideas were different." At that point, however, the team acquiesced: "As soon as [Pete] got that paper out there, I knew that was going to be it, because those guys wanted something so badly" (Josh's interview comment on video segments 372–374).

Although there were certainly multiple reasons for group 7's problems, the transcripts suggest that resistance to Pete's leadership was one contributor. However, it seems doubtful that it was working through that problem that finally got the team moving: Pete ultimately dictated the product to the group. Instead, it seems it was the additional temporal jolt of being 10 minutes from the deadline that made the difference, as video segments 372–374 suggest. But if teams feel they must progress at halftime or be unable to finish, why would a team try again at the last minute? Group 7 seemed to reduce the impossibility by collapsing its standards. As Pete said, "We've got to start generating garbage."

TABLE 5
Group 7: An Unsuccessful Transition

Description of Excerpt	Statements
Meeting videotape, 30 minutes elapsed	268 Pete: Alright. (looks at clock) It's 8:00. We've got half an hour to put this thing together. Are we ready to move on to concepts for the spot? 272 Pete: Do we have any disagreement on what we're going to sell? 273 (all): No. 274 Pete: We're selling the convenience and the public splash.
37 minutes elapsed	303 Fred: . . . but we really have to decide . . . what thing are you going to sell?
50 minutes elapsed	372 Fred: We don't have time—I think we really got to get it together. 374 Pete: We've got to get it done in 5 minutes . . . What kind of music fits? 375 Fred: Before we pick the music—what kind of thing are we going to write? 376 Pete: OK, let me give you—what I envisioned . . . (starts "talking" the script, and writes as he talks)
Group interview on midpoint segment	156 Pete: I thought . . . we took ten minutes to decide that but nobody really knew we had decided it so—make a point of saying "thirty minutes. Halfway through. We decided on what we wanted to try and do. Let's work for a concept . . ." And I felt we were pretty much on schedule. Something was going to come out of it. 157 Andy: That's where I felt . . . it's at that point that you write something. And I couldn't figure out how. . . . It's such a different kind of process. But we were still in the discussion mode instead of whatever mode you get into— 173 Fred: I felt we were wandering . . . I just wanted to make that thing stop so we could then define exactly what we were going to be doing. 174 Pete: It was really important to you to get something down on paper? 175 Fred: No. To stop something. We were discussing things we already talked about.
Later in the interview	191 Josh: There was a point . . . it was kind of fleeting . . . where I really felt I needed a break . . . but I wasn't able to bring it up because I continued to participate in the discussion. Where I almost wanted to say "OK everybody stop, sit down and write your one minute commercial. . . ." (Andy agrees) Right at that same point, we had about half an hour left and I wanted that time to think, and form an idea. And we didn't get it again. 235 Andy: Our problem was going from an idea phase to a paper phase. . . . That transition was really bad. . . . We should have said OK [this is it]. Then we could have—it's in production that the idea's going to fit in. But we had no framework to fit the ideas into. 236 Pete: I didn't feel it was acceptable at [that] time, to bring out paper. 237 Fred: Yeah, we had been trying to extend the time. 264 Pete: I didn't feel like I was leading it . . . I never got the feeling that I could structure their time. 265 Andy: Right. We never gave you that.

Group 7 was the only team that did not complete a script. After 59 minutes, members tried unsuccessfully to telephone their vice president to ask for a 15-minute extension. In the end, they had to ad-lib half of their commercial.

The evidence suggests it was not the case that group 7 simply had no transition. Team members felt it was time for a major shift and exhibited much of the same transitional behavior as other teams. However, they did not manage the opportunity successfully enough to launch a productive second half of the group's life span. Josh's interview comments directly support the hypothesis of the midpoint as a temporary (and in this case, missed) opportunity: "There was a point . . . it was kind of fleeting . . . where I really felt I needed a break . . . we had about half an hour left and I wanted that time to . . . form an idea. And we didn't get it again" (i: 191).

DISCUSSION

The results of this study suggest there is much to learn about group pacing and transitions from laboratory study. Not only did these laboratory group meetings follow patterns originally seen in naturally occurring teams of much longer duration; in their interviews, laboratory participants described their own development specifically in terms of time-based transitions and halfway-through shifts in work activities. There are several facets of the results to discuss: the substantive findings about transition and pacing processes gained from the transcript analyses, the degree to which the laboratory groups mirrored the findings from the field study, and implications for research and practice.

Transition Processes

The starting point for this study was a punctuated equilibrium model of development, according to which groups persevere with the same cognitive approaches to their projects until their midpoint, when they reinitiate a search for ideas and adopt new perspectives on their work (Gersick, 1988). The results of the current study support and extend the field-generated comparison between midpoint pacing efforts and problemistic search, March and Simon's (1958) concept that boundedly rational humans seldom change their basic strategies unless interrupted by a problem. In this case, the problem is the midpoint reminder of the deadline. The findings show a deliberate, abrupt attentional shift at the heart of groups' midpoint efforts to progress. This shift occurs in two related but separate parts: the closing of a group's initial phase of work and the pursuit of a next step that is specific to the group.

These results also seem related to findings from individual problem-solving research on the Einstellung effect, the tendency of subjects to persist with the same approach to a problem or series of problems whether or not that approach is productive (Luchins, 1940). Commenting on Jensen's (1960) findings, Ericsson and Simon reported that "the effect is not the result of inadvertent mechanization, but results from subjects' deliberate choices of strategy. A number of experiments have reduced the Einstellung effect by marking the test problems as separate problems rather than a continuation of the sequence of problems presented before" (1984: 129). Possibly, then,

groups' deliberate decisions to close one phase and open a new phase of their work involve a redefinition of their situation or of the task at hand. Such redefinition would be similar to "marking test problems" as starting a separate sequence and therefore calling for a new choice of strategy. Such redefinition may be critical to a team's ability to take new approaches.

Two ways of making this shift were observed. One way consisted of summarizing previous work, declaring it complete, and picking up a next subtask. A second way was observed in groups whose phase 1 agendas appeared to be floundering. These groups just dropped stalled phase 1 approaches and reached out for a fresh source of inspiration, something around which to crystallize further efforts. The special significance of the second way is that it confers special influence on whatever inspiration source the group happens to choose.

In the field study, several groups looked outward—most importantly, to outside stakeholders or requirements—to provide some of this inspiration. The laboratory groups used simpler resources: their music tapes. It is premature to interpret the laboratory findings as a negation of the field results. The lab teams' connections to their vice presidents did not compare to the powerful team-context relationships operating in real life, and team-supervisor communication was not two-way, as in the field. However, this study does suggest that teams searching for ideas at transition will turn to sources from which they expect some relevant help, not necessarily to external supervisors or contexts.

Pacing Processes

Because the model presented in this research links groups' transitions to time, it raises questions about pacing. What are the connections between groups' pacing efforts and their work progress? Why are temporal midpoints special, and how do groups pace themselves throughout their life spans? Why would groups' opportunity to make a quantum leap be best at—and possibly limited to—a particular slice of their time?

The field research that preceded this study suggests that bounded rationality, a cognitive barrier, limits a group's ability to take fresh approaches to its task before the midpoint of its life span. The current results suggest that group time-structuring regulates some motivational barriers as well. Group members discussed several sources of reluctance to move from one part of their task to the next in the first half of their time. One source was a fear that the next step might be too difficult. Another described source of inertia was a reluctance to narrow choices prematurely and forgo the chance to think of something better. A third source was a reluctance to compromise with teammates or bow to someone's leadership attempts and agree on one plan. In the face of such forces, group members seem to make a pact with themselves. They use time as a heuristic for deciding how long they will remain on the same track and when they must forge ahead. Such a heuristic is particularly

understandable for time-limited tasks that are novel and open-ended, in which temporal milestones are much more accessible than purely task-based signals for moving ahead. As one participant noted, "You always could make it a little bit better," but a deadline imposes limits.

Individual group members vary somewhat in how early and how consciously they start to structure their time and in the temporal milestones they choose. But transitions are unlikely to occur until there is some team agreement on the appropriate moment to shift ahead. The special power of the midpoint appears to be that it is the most likely time that members will select, consciously or unconsciously, as a key milestone. Groups are more likely to have a quorum of members simultaneously ready to make changes at that point than either earlier or later, and members are less likely to feel it is the wrong time to make changes than at any other point.

If a shared, precise temporal milestone, not a gradually mounting urgency, sets off a transition, the collective feeling that "now is the right time to move" must be temporally limited. Beyond a certain time, it will be clear that the midpoint (or other milestone) has passed. The current evidence suggests that if a milestone passes without the occurrence of enough perceived progress, a team will experience the passing as a failure, and their shared sense of opportunity will probably be lost until the next temporal milestone. The one field group whose transition failed was disbanded on the spot. The one laboratory group whose transition failed did not begin producing until the deadline was imminent. These results must be interpreted cautiously because of the small numbers of groups studied, but they do argue for further research on the consequences of, and remedies for, flawed transitions.

Groups' pacing patterns were more idiosyncratic after the transition than during phase 1. It is possible that pacing was more often driven by both temporal and task milestones during phase 2, as members worked on specific pieces of product designs made more concrete at the transition. Such an interpretation is consistent with Norden's finding about project managers' handling of schedule delays in two- and three-year-long R&D projects:

The reduction of maneuvering room [to recover lost time] is not an absolute function of the time remaining, but depends on the relative reduction in the "degrees of freedom" inherent in tactical choices made from the start . . . [As one respondent indicated]: "When you're half-way through a project, you're locked-in a lot deeper than when you're just getting under way" (1965: 306).

A Field-Laboratory Comparison

There were some differences between the dynamics observed in this laboratory study and the dynamics observed in the naturally occurring groups. In the field, groups met on several occasions. They prepared home-

work and communicated with independently acting outside stakeholders between meetings, and they often extended their midpoint meetings beyond their usual time limits in order to complete a key piece of work. Because of the laboratory design, the groups described in this study lacked the flexibility to extend their time spans, so it was not possible to see comparable changes in groups' routines or external interaction. It was not possible to identify a clearly bounded "transition meeting" with a set of transition accomplishments. Because of these restrictions, too, laboratory transitions were more temporally compact and less complex than some of the transitions observed in the field. More important, the laboratory setting did not simulate team-supervisor relations very well, thus restricting the generalizability of results dealing with that facet of team development.

A final difference has to do with the shortness of the time span for the laboratory teams' work. The fact that the lab groups made many more time comments overall than the field groups and the increased frequency of all the lab groups' time comments toward the end of their meeting hour suggest that the sharper a group's time constraints, the more frequently participants will pay explicit attention to time and pacing. The intensity of teams' attention to time was probably exaggerated in the one-hour laboratory sessions. To an extent, that exaggeration was a great advantage because it heightened the very phenomenon I wanted to study. Since the midpoint effect was first discovered in the field and then observed in the lab, that particular finding appears to be robust. However, it is important to be cautious about generalizing laboratory pacing patterns back to the field wholesale.

Notwithstanding these differences, the central features of the midpoint transition did emerge strongly in the laboratory: groups paid special attention to time at the midpoint of their time spans, made abrupt shifts in the focus of their work activities, and depended on midpoint agreements to provide a basis for work in the second half of their time. If laboratory task groups can display a punctuated equilibrium pattern with a midpoint transition, we can use laboratories to see how various interventions cause groups to depart from that baseline. Such settings appear to be promising sites for further research.

Implications for Research and Practice

The current findings have several implications for practice that in turn suggest questions for research. Uncertain or shifting deadlines are a fact of life in many organizations. Interdependent organizational units and groups may keep each other waiting, may suddenly move deadlines forward or back, or may create deadlines that are known to be earlier than is necessary in efforts to control erratic workflows. The current research suggests that the consequences of such uncertainty may involve more than stress, wasted time, overtime work, and intergroup conflicts. Synchrony in group members' expectations about deadlines may be critical to groups' abilities to

accomplish successful transitions in their work. The laboratory could be a good place to examine groups' reactions to uncertain or shifting deadlines and to try out ameliorating interventions.

A second area is the appropriate timing for interventions designed to assist or influence groups' work. The field study suggested that interventions or environmental events that called for dramatic changes would be especially powerful at the very beginning or midpoint of groups' life spans but might be resisted at other times. The laboratory groups examined here provided consistent evidence that members were quite receptive to teammates' efforts to redirect the team's attention at the midpoint and much less receptive before or after that. The laboratory could be a good place to test the effects of environmental changes or interventions at different points in groups' life spans.

A third area concerns effective ways to pace and manage groups through their life spans. The subjects in this research had no exposure to the hypotheses of this study, yet they described their own transition processes with great clarity and managed their time relatively deliberately. Those findings suggest that people learn substantial aspects of group pacing and might be able to improve upon that learned behavior. For example, without conscious, alternative planning, the midpoint appears to be the most likely temporal stimulus for groups' primary jump ahead, but the case of group 8, with its 20-minute transition and three-segment meeting, suggests the possibility of more planful tailoring of groups' pacing to their tasks and time.

Similarly, groups might be taught to anticipate characteristic challenges of the transition and helped to develop various ways of handling those challenges. It should be noted that managing the interaction process is not the only challenge to address. The transition may well be an acid test of whether or not a team's design, including its membership composition, task structure, and contextual supports, is workable. If the boost of the transition cannot galvanize a team, it may be suffering from especially serious design flaws.¹¹ Overall, the laboratory might be a good place to see whether group members, leaders, and external supervisors can be trained in how to manage different periods of groups' life spans most effectively. Specific suggestions for such training appear in Hackman and Walton (1986) and Gersick (1988).

A final implication applies more broadly to research on temporal issues and the correspondence between laboratory time and field time. The findings show that groups, at least in the research domain of this study, regarded time differently as the laboratory hour progressed¹² and, perhaps, as their

¹¹ Hackman (1986) contrasted design and process determinants of group effectiveness.

¹² McGrath and Kelly (1986) found that groups solving anagrams, given relatively short (or long) time limits on the first of two trials, persisted in working at a faster (or slower) pace on the second trial, even when the amount of time they had was lengthened (or shortened). A finding of such persistence in pace clearly differs from the current findings. It is, however, consistent with the findings of research on Einstellung effects that McGrath and Kelly's groups, (continued)

work became more concrete. This attitudinal shift suggests the importance of attending to task type and to the whole temporal context in which any segment of activity occurs.

Limitations of this Study

As pointed out in the above section on field-laboratory differences, there are many respects in which this laboratory simulation departed from natural settings. In addition, this study included only a small number of groups, from one population, doing one kind of task, under one set of conditions. People less experienced in group work or more experienced at a task might use their time differently in a laboratory or might describe their own work differently in interviews. Finally, research to date has been limited to a particular domain: groups with some discretion over their own work processes, with open-ended tasks and deadlines to meet. Further research is required before the current results can be generalized beyond that domain.

CONCLUSIONS

The results of this study suggest that the mechanisms groups use to pace their work may have critical effects on members' collective motivation to move ahead and on attentional and perceptual shifts that allow progress to occur. The reliable appearance of a midpoint transition, participants' articulate description of their transition dynamics and pacing behavior, and the deliberate quality of groups' efforts to advance at the midpoint of their allotted time have two important implications. First, pacing and transition dynamics may be facets of creative group work that are both consequential for group effectiveness and amenable to improvement through learning. Second, laboratory study holds much promise for enriching understanding of pacing behavior and punctuated equilibrium patterns in group development.

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with 10 or 20 minutes per trial and anagrams to do throughout, perceived themselves as having essentially the same task across trials, but groups in the current study perceived the nature of their task as changing at the midpoint.

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Connie Gersick earned her Ph.D. degree at Yale University; she is an assistant professor in organization and strategic studies at the Anderson Graduate School of Management, University of California, Los Angeles. Her research interests include group effectiveness and change processes in human systems.

DIVERSIFICATION STRATEGY AND R&D INTENSITY IN MULTIPRODUCT FIRMS

BARRY BAYSINGER
ROBERT E. HOSKISSON
Texas A&M University

This study provides empirical evidence that choice of diversification strategy systematically affects R&D intensity in large multiproduct firms. Research and development intensity in dominant-business firms was found to be significantly higher than in related- and unrelated-business firms and was also higher in related-business firms than in unrelated-business firms. These findings suggest the need to examine the implications of different types of corporate diversification strategy on the management of corporate-strategic-business-unit relations in large multiproduct corporations.

Corporate diversification has emerged as a major trend in the postwar U.S. economy. For instance, in 1949 only about one-third of the *Fortune* 500 industrial corporations generated revenues from more than one product line. By 1974, the proportion of diversified firms among the *Fortune* 500 had doubled to approximately 67 percent (Rumelt, 1974, 1982). As a result, large diversified firms currently account for a substantial percentage of the total assets managed by U.S. industrial establishments (Rumelt, 1982). Understanding why firms diversify and how diversification affects the way the resources are managed in diversified firms have naturally become important objectives of strategy research.

Research addressing the question of why firms diversify is extensive and has often focused on the relation between diversification and research and development efforts. For example, Penrose's (1959) theoretical analysis and Chandler's (1962) field research both suggested that firms like E. I. Du-pont de Nemours initiate diversification strategies in response to an excess of technological resources, which are deployed in new directions. Other researchers have suggested that firms may improve the efficiency of R&D expenditures through diversification because of economies of scope (Gupta & Govindarajan, 1986; Hambrick & MacMillan, 1985; Kamien & Schwartz, 1982; Porter, 1985). Whatever the reason, firms have pursued the secular

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growth in diversification we noted initially mainly through mergers and acquisition (Porter, 1987). Some investigators have suggested that the adoption of a multidivisional (M-form) structure and internal controls has fostered this growth (Williamson, 1985).

An important question raised by the popularity of diversification concerns the performance effects this strategy may have on multidivisional corporations and the strategic business units (SBUs) composing them (Armour & Teece, 1978). Although many agree that such effects exist, there is some disagreement over exactly what they are (Hoskisson, 1987), particularly with respect to the relation between diversification and R&D activity in multi-product corporations.

For instance, Williamson (1975, 1985), elaborating on Chandler's (1962) original work, argued that firms virtually always implement diversification through the adoption of multidivisional structure and controls. He went on to argue that those characteristics should enhance firm performance, especially with respect to managers' willingness to assume risk and, hence, emphasize R&D and innovation. Conversely, Burgelman (1983a, b), Hayes and Abernathy (1980), and more recently Hill, Hitt, and Hoskisson (1988) have developed arguments suggesting that division managers operating within an M-form system of internal controls avoid risky strategies and instead sacrifice long-term investments in research and development to more immediate financial performance goals. Questions concerning the performance implications of corporate diversification strategies and the way they are implemented, especially with respect to research and development spending, thus remain unsettled in the strategy literature.

Given that recent declines in the competitiveness of U.S. firms in international trade have been traced to diminished R&D intensity (Young, 1985), attempting to resolve these differences seems a worthy objective of research. Toward this end, the present study examined the relation between corporate diversification strategy and R&D spending decisions in large multiproduct firms. By focusing exclusively on large diversified firms, we adopted the assumption that the M-form is the primary organizational structure in use in these firms (Rumelt, 1974, 1982). Therefore, we expected that by differentiating these M-form firms on the basis of their corporate diversification strategies, performance effects often ascribed to M-form structure could be more accurately ascribed to the previously unmeasured effects of corporate diversification strategies.

The theoretical development begins with a brief discussion of the differing economic objectives of various diversification strategies and how the internal control systems firms use to implement diversification strategies affect the attainment of those economic objectives (Ackerman, 1970; Dundas & Richardson, 1982; Hill & Hoskisson, 1987; Hoskisson, 1987; Hoskisson & Hitt, 1988; Kerr, 1985; Lorsch & Allen, 1973). The researchers cited have suggested that dominant-business and related-constrained diversification strategies are most likely to be implemented with internal controls that foster

risk taking and, hence, R&D spending but that related-linked and unrelated diversification strategies are most likely to be implemented using internal controls that inhibit risk taking and, hence, R&D spending. Although only examining these relations directly could validate those suggestions, we provide preliminary research on the issue by examining differences in R&D intensity across a group of 971 firms divided into four major diversification strategies.

CORPORATE STRATEGY AND INTERNAL CONTROLS

Previous research has suggested that control arrangements within a basic M-form framework must be consistent with a firm's corporate diversification strategy if the firm is to realize the economic benefits associated with that strategy (Hill & Hoskisson, 1987). Diversification strategies differ in terms of both the number of segments in which the firms adopting them operate and the relative importance of each segment to total firm sales (Jacquemin & Berry, 1979; Palepu, 1985). Diversified firms may also be distinguished by the varying degrees of emphasis managers place on the dominant (usually the original) business and by the nature of relations among divisions, which may be related or unrelated (Rumelt, 1974). Therefore, dominant-business, related-constrained, related-linked, and unrelated diversification are the four major categories of diversified firms typically studied.

Firms implement diversification strategies by adopting structures and internal control systems that rationalize relations between corporate headquarters and SBUs (Chandler, 1962; Williamson, 1975). Stated from the perspective of contingency theory, superior organizational performance should result, all else being equal, when firms implement dominant-business and related-constrained diversification strategies with an emphasis on a system of strategic controls. Gupta (1987) suggested that such controls emphasize openness in corporate-SBU relations and the use of subjective data in evaluating the performance of SBU, or division, managers. Likewise, superior organizational performance should result when firms implement related-linked and unrelated diversification strategies with an emphasis on a system of strict financial controls. This second type of control system features somewhat distant corporate-SBU relations in which objective financial criteria are strictly applied in evaluating SBU, or division, managers' performance (Gupta, 1987). Figure 1, which maps these control systems into various diversification strategies, is based on a review of a large and growing body of research on strategy implementation (Ackerman, 1970; Allen, 1978; Berg, 1965; Donaldson, 1986; Dundas & Richardson, 1982; Eccles & Carley, 1987; Galbraith & Kazanjian, 1986; Hill & Pickering, 1986; Hoskisson & Hitt, 1988; Kay, 1982; Kerr, 1985; Lorsch & Allen, 1973; Pitts, 1977).

To date, research on the implementation of corporate diversification strategy has focused on the organizational performance implications of the contingency relations summarized in Figure 1 (Gupta, 1987; Hill & Hoskis-

FIGURE 1
Diversification Strategy and Degree of Emphasis on Strategic
Versus Financial Controls

		Diversification Strategy			
		Dominant-business	Related-constrained	Related-linked	Unrelated
Internal Controls of Corporate Headquarters	Emphasis on Strategic Controls	High	High to moderate	Moderate to low	Low or none
	Emphasis on Financial Controls	Moderate to low	Moderate	Moderate to high	High

son, 1987; Hoskisson, 1987). Following those lines, we used empirical measures in this study that stressed the relationship between the type and level of diversification and R&D investment. Although we could not readily measure the control strategies adopted in each of the 971 firms studied directly, the particular internal controls firms have been forced to use in implementing those strategies may drive the relation between corporate strategy and R&D intensity.

CONFLICTING VIEWS OF MANAGERIAL RISK AVERSION IN DIVERSIFIED FIRMS

Theory on managerial risk aversion in large diversified firms has focused on the effects of M-form structure on managerial decision-making horizons, attitudes toward risk and, hence, willingness to invest in research and development. Some authors have suspected, as we indicated in the previous section, that the multidivisional structure of diversified firms may be inherently conservative, which suggests that, in part, the recent declines in U.S. competitiveness may be traced to the postwar emergence of large diversified firms as important economic institutions. Others have maintained that the controls used to manage diversity in M-form corporations should actually encourage decision making that is oriented toward the long term and risk taking; if that is so, we need to search elsewhere for explanations for reduced risk taking and, hence, competitiveness.

One possibility is that once an M-form structure is in place, different corporate diversification strategies may affect managerial risk propensity, as measured by R&D investment. Although some authors have argued that R&D spending leads to diversification (Chandler, 1962; Penrose, 1959), we view

this interpretation as having primarily been true before most firms had implemented an M-form system of managing diversity. Once firms have adopted a multidivisional structure, the type and extent of diversity they have may affect the way diversity is managed.

Criticisms of M-form Structure and Controls

An important criticism of diversified M-form firms is that division managers operating within their internal control systems develop short time horizons and thus avoid risky R&D investments, even when those investments promise a positive net expected value (Dearden, 1960, 1969; Hayes & Abernathy, 1980; Hill & Hoskisson, 1987; Loescher, 1984; Norburn & Miller, 1981; Rappaport, 1978; Solomon, 1968; Stonich, 1981). The basic argument these authors have offered is that in large diversified firms, corporate managers tend to use a return-on-investment (ROI) criterion for evaluating division managers' performance (Dundas & Richardson, 1982), causing division managers to meet short-term ROI objectives by reducing expenditures that are not essential for the attainment of short-run returns but are critical to the maximization of organizational efficiency in the long run. Consequently, there may be a tendency in large M-form firms for division managers to reduce R&D expenditures, market research expenditures, and new capital investments (Jaeger & Baliga, 1985).

Other investigators have suggested that M-form structure adversely affects top management's willingness to stress R&D as a basic component of competitive strategy. This concern reflects the view that M-form structure, rather than being simply a device for implementing corporate diversification strategy, may also be a consolidation and control mechanism that is inherently conservative (Burgelman, 1983a). In an M-form firm, a single concept of corporate strategy may become deeply ingrained in top managers' minds; consequently, their ability to deal with autonomous strategic behavior is low. These top managers therefore attempt to manipulate the firm's structural context in order to bring autonomous behavior under control. In M-form firms, "the range and scope of these strategic behaviors may become narrower while their probability of failure may decrease" (Burgelman, 1983b: 66). Large diversified firms thus may tend to provide environments hostile to innovation: the M-form structure may be inherently variance-reducing.

These concerns over the performance implications of multidivisional diversification are well worth taking seriously. It is clear that declines in U.S. competitiveness have mirrored the emergence of diversified multidivisional corporations as a major economic institution. Yet, it is also possible that problems ascribed to M-form structure in general actually apply only to certain types of diversified firms that employ an M-form structure.

The Internal Capital Market Argument

Williamson argued that M-form structure and internal controls represent an internal capital market that induces SBU managers to choose opti-

mally risky levels of R&D spending. Within a multidivisional firm, corporate managers usually evaluate division managers' performance on the basis of both financial performance and other relevant information. Top managers generally have access to information that is both more abundant and superior to that available in the external capital market.¹ Thus, although the number of investment opportunities available within multidivisional firms is limited, at least in comparison to the number of opportunities in the external capital market, top management's knowledge with respect to each is "incredibly deep" (Williamson, 1970: 177). Consequently, in diversified M-form firms, the "confounding of risks and decisions, which complicates [external capital] market assessments, can . . . be unpacked with greater precision and confidence. . . . [External capital] markets, in contrast, are presumed to have less knowledge of idiosyncratic circumstances, employ shorter time horizons, and are relatively severe (unforgiving)" (Williamson, 1985: 150). Top-level managers in diversified multidivisional firms thus have the option of using both strategic controls, which feature open corporate-SBU relations and subjectivity in assessing division performance, and strict financial controls, which are characteristic of external capital markets, to fine-tune their understanding of division proposals and performance.

Clearly, there is a conflict of visions between Williamson and those who claim that multidivisional structure induces short-run thinking. Yet both sides admit that the relation between M-form structure and R&D intensity is less than clear-cut. As Burgelman, citing Greiner (1972) and Mintzberg (1978), observed: "[corporate] structure may motivate or impede strategic activity in unanticipated ways" (1983b: 67). Moreover, Williamson admitted that "whether the potential advantages of the divisional structure in auditing respects actually induce more aggressive risk-taking . . . is uncertain" (1975: 146).

SYNTHESIS AND RESEARCH HYPOTHESES

The hallmark of M-form organization is the decomposition of strategic and operational decision making, accompanied by the decentralization of decision making so that it is carried out in semiautonomous divisions (Williamson, 1970). Decomposition and specialization of strategic and operating responsibility economize on the limited information-processing capacity of corporate managers. However, in a firm that has become highly diversified, both in terms of the number of divisions under top-management control and in terms of the lack of relatedness among product divisions, it seems highly unlikely that any given corporate manager will be adequately

¹ In the context of this paper, external capital market refers to sources of venture capital external to the firm. Such markets are populated by bankers, investment firms, brokerages handling initial public offerings, venture capitalists, and so forth.

familiar with even a small percentage of the businesses in the firm's portfolio. Even for firms engaged in related diversification, top-level managers' ability to gather, process, and interpret the information needed to evaluate divisional performance accurately and allocate resources and rewards may be highly limited (Williamson, 1975).

Managers in highly diversified firms—those having related-linked or unrelated strategies—generally have little first-hand knowledge of the operating affairs of an industry, technology, or geographic region (Dundas & Richardson, 1982). Thus, they may tend to focus attention almost exclusively on financial results—particularly the net profit for a period and the rate of return on invested capital (Ackerman, 1970; Bower, 1972; Hill & Hoskisson, 1987; Lorsch & Allen, 1973). In contrast is the situation in dominant-business firms and even in related-diversified firms that have engaged in only limited diversification. In such firms, the ability to use both strategic and financial controls should be greater, all else being equal, because corporate managers cannot pay the same amount of attention to a large number of diverse divisions that they can to a smaller number of more related divisions.

The preceding analysis does not conflict with either of the previously discussed schools of thought on the relation between M-form structure and managerial incentives. Rather, Williamson's assessment of M-form firms as internal capital markets may be found to be more applicable to dominant-business and related-constrained M-forms than to other types of firms. In dominant-business and related-constrained firms, the confounding of risks and decisions may be reduced to the extent that corporate executives have access to information about the strategic desirability of division managers' decisions. Likewise, although Burgelman's view that M-form controls are inherently variance-reducing also seems accurate, it may be more applicable to related-linked and unrelated firms. In such firms, the confounding of risks and decisions is more likely because internal control systems operate mainly on the basis of objective performance data.

In this research, we limited our attention to the empirical relation between corporate strategies and actual R&D expenditures. However, previous research on the internal control implications of different corporate diversification strategies and the behavioral implications of different internal control strategies underlay our analysis. Therefore, the following hypotheses are offered:

Hypothesis 1: All else being equal, R&D intensity in diversified M-form firms will be negatively related to a continuous measure of total diversification.

Hypothesis 2: All else being equal, with diversification measured categorically, R&D intensity will be greater in diversified M-form firms following dominant-business and related-constrained strategies than it will be in more

highly diversified corporations following related-linked and unrelated diversification strategies.²

SOME ECONOMIC DETERMINANTS OF R&D SPENDING

The analysis we have offered is not meant to suggest that the nature of their diversification strategy solely determines the allocation of resources to research and development in large firms. Rather, although corporate diversification strategies may influence R&D spending decisions, a number of other economic factors may also influence those decisions. Consequently, empirical analysis must be conducted within the context of a well-specified model of R&D investment to isolate the incremental effects of corporate strategy on R&D intensity. To provide this context, this section summarizes current and past research conclusions on the economic determinants of corporate-level research and development spending. As described in the Methods section, we operationally defined these economic determinants as covariates or control variables for the empirical tests in this study.

Industrial Organization Economics and R&D Spending

Economic models of R&D spending tend to focus on organizational and environmental factors that should affect the efficiency and expected net benefits of those expenditures and, hence, their internal rates of return (Hambrick & MacMillan, 1985). These models typically include such factors as market structure, availability of proprietary technology, available liquid resources, patent protection, and so forth (Kamien & Schwartz, 1982; Scherer, 1967). This study focused on a parsimonious set of such variables, limiting attention to four variables that are relevant to business-level R&D proposal generation, and corporate-level support for those proposals, which, when aggregated, comprise corporate R&D spending levels. The set of variables we used included technological opportunity, current liquidity, debt position, and market structure.

Technological opportunity. Previous research has shown that the optimal level of R&D investments made by a firm depends in part on technological opportunity, which is the degree to which the firm's market demands or accepts product innovations (e.g., Comonar, 1967; Foster, 1982; Hambrick & MacMillan, 1985; Link & Long, 1981; Phillips, 1966). Industries differ with respect to the extent of their basic scientific knowledge in the field in which they operate: the greater this knowledge, the more efficient will be the conversion of R&D inputs into outputs. Therefore, technological opportunity affects basic R&D spending.

Current liquidity. Common sense suggests that R&D spending should be

² We felt that two hypotheses were necessary because two operational approaches, continuous and categorical, are often used in measuring diversification (Pitts & Hopkins, 1982).

positively related to the flow of funds available to support such investments (Grabowski, 1968). That is, regardless of the desirability of R&D spending in support of competitive strategy, the ability to make these investments requires financial resources. Of course, in an efficient capital market firms may borrow such funds for worthwhile projects at competitive rates. Yet, in such markets it may very well be difficult to assess risky projects accurately and as a result, the availability of internal sources of finance enhance a firm's ability to engage in active R&D investment.

Moreover, financial liquidity permits a firm to avoid the borrowing costs associated with risky investments, which reduces the cost of R&D financing to the internal opportunity cost of capital (McEachern & Romeo, 1978). Therefore, current liquidity and basic R&D spending are directly related.

Debt position. To the extent that high debt is associated with creditor control over strategy formulation, the amount of debt a firm carries should influence R&D intensity. Recent developments in the theory of the firm suggest a need for analysts to consider conflicts of interest among corporate stakeholders in attempting to understand corporate outcomes. As Smith and Warner, for example, observed, "If a firm sells bonds for the stated purpose of engaging in low-variance projects and the bonds are valued at prices commensurate with that low risk, the value of the stockholders' equity rises and the value of the bondholders' claim is reduced by substituting projects which increase the firm's variance rate" (1979: 118–119). Smith and Warner thus argued that financial institutions, as corporate constituencies, will be more risk-averse than a firm's shareholders. To the extent that a firm's debt position reflects the influence of financial institutions on decision making, debt and basic R&D spending are inversely related.

Firm size and industry concentration. Finally, economic reasoning suggests that across all diversification strategies, the managers of large firms in concentrated industries should be more willing to invest in research and development than the managers of small firms operating in atomistic industries (Kamien & Schwartz, 1982). The former tend to be relatively well insulated from competitive pressures and are thus better able to internalize the benefits of R&D investments that yield new products and processes. Industrial organization research has revealed that highly capitalized corporations display higher levels of R&D intensity than their relatively smaller, but still absolutely large, rivals, *ceteris paribus* (Scherer, 1980). Moreover, even among large firms, the largest will enjoy the greatest economies of scale in R&D. For example, previous research has shown size to be related positively to both R&D spending and R&D productivity (Rothwell, 1984). Therefore, firm size is directly related to R&D intensity.

To summarize, R&D intensity should vary across diversification categories, but only within the context of various environmental and financial constraints. Including technological opportunity, current liquidity, debt position, industry concentration, and organization size in a model of corporate-level R&D spending should thus help isolate the effect of diversification strategy on this study's dependent variable of interest.

METHODS

Data

The firms providing data for this study were drawn from the universe of U.S. industrial corporations included in Standard and Poor's COMPUSTAT Services data base. We isolated all manufacturing firms in the data base reporting research and development expenditures in the 1980–82 period for whom archival data on other relevant organizational and financial attributes were available. The 971 such organizations were representative of the *Fortune* 1,000 industrial firms for the period studied.³ The size of the group seemed more than adequate to support the analysis used in the study; the number of firms reporting R&D expenditure and the number of firms that were available on the segment data from COMPUSTAT used to create the diversification strategy variable were the primary limits on group size.

Dependent Variable

R&D intensity, the dependent variable used in the study, was measured as a firm's reported spending on research and development per \$1,000 of sales. This variable is the most commonly used measure in studies of R&D intensity (Hambrick & MacMillan, 1985). Of course, R&D intensity is not a perfect measure of innovation in a corporate setting. For example, R&D intensity is likely to be lower in large firms; small, entrepreneurial, high-technology firms have reported R&D-to-sales ratios of 20–25 percent, levels virtually never observed in large corporations. Moreover, to the extent that a firm skillfully leverages its R&D spending through the successful marketing of new products and services, its R&D intensity will be lower than that reported by less skillfully leveraged firms. Consequently, within reasonable limits of sales volume and time, low R&D intensity ratios may actually be a positive indicator of innovativeness. Finally, in firms that have diversified into areas in which the level of R&D required to maintain competitive advantage is relatively low, such as some consumer goods and commodities, low levels of R&D spending should not be taken to suggest low levels of innovativeness. Fortunately, among 971 firms, these differences should tend to be nonsystematically distributed across the four strategy types of interest.

Such distribution notwithstanding, it is clear that care must be taken in interpreting the results of models of corporate R&D spending. Consequently, the dependent variable we used was meant to reflect only what it measures—the intensity of investment in the inputs supporting the innovation

³ The group studied consists of a broader range of firms than would be found in the *Fortune* 1,000 industrial firms because some larger firms did not report R&D expenditure or the segment data necessary to calculate the diversification variable. Although we believed the group to be representative of the *Fortune* 1,000, the 971 firms studied includes some smaller firms reporting R&D expenditure that would not be found in the *Fortune* 1,000.

process—rather than innovation itself. Moreover, by using the economic covariates described in the preceding section, we sought to adjust our analysis for intervening influences.

Control Variables and Covariates

According to Wilson, technological opportunity should be prominent in industries producing “primarily durable final goods” or “products with complex configuration options” (1977: 175). In addition, firms operating in industries with a high level of technological opportunity tend to produce products for which there is a “richness of opportunities for new product breakthroughs” (Wilson, 1977: 176). The lowest levels of technological opportunity are found in industries producing mostly nondurable goods and services—commodities, for example—with simple or few configuration options and limited opportunities for new product breakthroughs.

Average industry R&D intensity for 1980–82 represented technological opportunity in this study. Average industry R&D intensity was R&D expenditure divided by sales averaged for all firms in an industry; we then averaged this number across the three-year time frame, 1980–82. This variable was created for all three-digit Standard Industrial Classification (SIC) code categories from the universe of approximately 6,500 firms on the COMPUSTAT tapes for which R&D expenditure and sales data were available. Industries with the highest levels of technological opportunity included chemicals, computers, drugs, aerospace equipment, electrical equipment, precision instruments, and photographic equipment and supplies. Industries with the lowest levels of technological opportunity were metals, stone, clay, glass, textiles, food, wood, and paper products.

A standard measure of liquidity is the current ratio, or current assets divided by current liabilities, and we used this ratio as a measure of the funds available for allocation to research and development. Size was measured by the natural logarithm of total assets. Industry concentration was measured by a Herfindahl index⁴ of the three-digit SIC code for the primary industry by which each firm was classified in the COMPUSTAT data set. The Herfindahl index of industry concentration (H) was given by $H_i = \sum_{j=1}^n (1 - (\text{market share}_j)^2)$, where i is the number of firms in the industry and market share_i is the market share for the firm. As a result, differences in this ratio across firms should capture relative concentration and therefore market power within the group of firms.⁵

⁴ For a recent discussion of the Herfindahl index as a measure of market power, see Sleuwaegen and Dehandschutter (1986).

⁵ It is possible that a dominant business may represent only a small portion of total revenue for highly diversified firms. However, a firm's orientation and distinctive competencies tend to focus on strategic issues involved in its primary industry. Therefore, allocation of resources is likely to be based on a historical orientation to a primary industry (Galbraith & Kazanjian, 1986).

TABLE 1
Examples and Outcomes for Components of the Entropy Measure of Diversification^a

Sales								
Total	Group 1 ^b		Group 2			Diversification		
	Segment 1	Segment 2	Segment 1	Segment 2	Segment 3	Total	Related	Unrelated
100	100							
100	95	5				0.20	0.20	
100	90	10				0.32	0.32	
100	80	10	10			0.64	0.32	0.32
100	70	20	10			0.80	0.48	0.32
100	60	10	10	10	10	1.23	0.62	0.61
100	20	20	20	20	20	1.61	0.94	0.67

^a The measure was derived from Palepu (1985).

^b Groups refer to type of business; segments refer to product line within businesses. Groups are different 2-digit SIC codes, and segments are 4-digit codes with the same first two digits.

Diversification Strategy Variables

The entropy measure of diversification (Amit & Livnat, 1988; Jacquemin & Berry, 1979; Palepu, 1985), which is commonly used in industrial organization studies, was employed to form meaningful diversification strategy types for this study. The entropy measure of diversification was defined as $\sum P_i \ln(1/P_i)$, where P is the sales (dollar value) attributed to segment i and $\ln(1/P_i)$ is the weight for each segment i , or the logarithm of the inverse of its sales. The measure thus took into account both the number of segments in which a firm operated and the relative importance of each segment in total firm sales.

This measure was attractive because it could be broken down into two components, an unrelatedness component and a relatedness component, so that $DT = DR + DU$, where DT is total diversification and DR and DU are entropy measures of related and unrelated diversification. DR was defined as the related diversification arising out of operating in several segments within an industry group, whereas DU was defined as unrelated diversification between industry groups. We used SIC codes to define the industry segments and groups, treating two-digit SIC industries as the industry groups and four-digit SIC industries as the industry segments.⁶ Table 1 provides an illustration of the components of the entropy measure and resulting calculations. The DR and DU components of the diversification measure were calculated from Standard and Poor's COMPUSTAT segment file for 1980–82. We chose those years because many large firms representative of the group studied subsequently underwent an era of restructuring.

⁶ For more detailed information on the formation of these components, see Palepu (1985).

A simple K-means clustering algorithm (Hartigan, 1975) was used to identify corporate strategy types from these two components. Both business- and corporate-level strategy research have often used this method to form strategy categories (Hambrick, 1984). The algorithm forms centroids based on mean distances so that all distances between observations in the same cluster are less than all distances between observations in different clusters.

The two variables, *DR* and *DU*, were clustered to form the four corporate strategy types: dominant-business, related-constrained-business, related-linked-business, and unrelated-business. This clustering provided a punctuated continuum within the basic M-form framework, ranging from firms that have not diversified greatly to those that are highly diversified. As was discussed earlier in this article, a mixture of strategic and financial controls is much more likely to occur in dominant-business and related-constrained M-form firms; in related-linked and unrelated M-form firms, financial controls are much more likely to dominate (see Figure 1). To the extent that this is the case, differences across *DT*, the continuous measure of diversification we used in the test of Hypothesis 1, and across the diversification categories used in the test of Hypothesis 2 are likely to lead to differences in R&D intensity. Table 2 presents the means and standard deviations associated with each major strategy type.

A median split methodology was also used to arrive at corporate strategy gestalts. The results from this approach produced similar empirical outcomes, but we deemed the clustering approach more sound. We also tested the reliability of empirically derived categories. We gave a subgroup of firm names to three independent analysts who sought, using the more subjective methodology described by Rumelt (1974), to classify the firms into corresponding categories. Averaging and correlating the independent analysts' ratings with those used here resulted in a correlation coefficient of .58. The results of this analysis mirror those of Montgomery (1982), who found that the SIC-based method provided results highly comparable to Rumelt's.

TABLE 2
Strategy Categories Resulting from Cluster Analysis of Related and Unrelated Components of the Entropy Measure of Diversification^a

Clusters	<i>N</i>	Related	Unrelated
Dominant-business	525	0.374 (0.324)	0.399 (0.327)
Related-constrained	78	1.322 (0.258)	0.243 (0.236)
Related-linked	211	0.757 (0.258)	0.960 (0.239)
Unrelated	160	0.238 (0.192)	1.370 (0.267)

^a Means are shown, with standard deviations in parentheses.

Data Analysis

Table 3 reports means, standard deviations, and intercorrelations among key study variables. As Table 3 shows, intercorrelations among the full set of independent variables were sufficiently low to preclude the problem of unstable coefficients in the regression and analysis of covariance procedures. Regression, one-way analysis of variance, and analysis of covariance were employed to assess the validity of the study's central hypothesis. We used regression analysis to provide information on the overall direction and signs of all independent variables, and dummy variable regression to evaluate the categorical specification. Each strategic category derived from the cluster analysis was assigned a value of unity if it was included in the category and a value of zero otherwise. We employed one-way analysis of variance with associated examination of contrasts to show mean differences in R&D intensity and then added the control variables and covariates to the model through an analysis of covariance procedure. From that procedure, we were able to derive least-square means adjusted for the covariates. Figure 2 diagrams the adjusted means to show the pattern of results for each strategy category in relation to R&D intensity.

RESULTS

Table 4 presents the initial results of testing the hypotheses. The results for the first regression equation support Hypothesis 1. The regression estimate shows a negative relation between the continuous measure of total diversification and R&D intensity.

Also, the results for the second regression equation (Table 4), testing the relation between the dummy categories of diversification and R&D intensity (Hypothesis 2), show opposing, significant signs for the dominant and un-

TABLE 3
Means, Standard Deviations, and Intercorrelations for Variables Overall^a

Variables	Means	s.d.	Correlations						
			1	2	3	4	5	6	7
1. R&D intensity	2.65	3.20							
2. Current ratio	2.53	1.06	.15*						
3. Debt/size	.17	.12	-.17*	-.14*					
4. Size	5.25	1.85	-.02	-.35*	-.04				
5. Concentration	.83	.12	.11*	-.02	-.02	.08*			
6. Total diversification	1.18	.52	-.18*	-.23*	.10*	.45*	.05		
7. Related diversification	.51	.41	-.02	-.07*	.04	.24*	.10*	.46*	
8. Unrelated diversification	.66	.49	-.17*	-.18*	.06*	.29*	-.03	.64*	-.35*

^a N = 971.

* p < .05

TABLE 4
Results of Regression Analysis Examining the Relationship
Between Diversification and R&D Intensity^a

Variables	Continuous Measure of Diversification		Categorical Measure of Diversification	
	Weight	<i>t</i>	Weight	<i>t</i>
Intercept	-0.23	0.30	-0.94	0.84*
Total diversification	-0.92	-4.58*		
Diversification strategies				
Dominant-business			0.84	3.46*
Related-constrained			-0.09	0.26
Related-linked ^b				
Unrelated			-0.64	2.15*
Technological opportunity	0.05	12.88**	0.05	12.78**
Concentration	1.87	2.48*	1.72	2.29*
Size	0.16	2.66*	0.13	2.34*
Current ratio	0.34	3.61**	0.32	3.46**
Debt/size	-2.60	-3.32**	-2.37	-3.04**
R ²	.23**		.23**	

^a N = 971.

^b See the intercept for relevant statistical test.

* $p < .05$

** $p < .01$

related categories. The regression coefficient for the related-constrained category is not statistically significant. Since the related-linked strategy was the omitted category in the dummy-variable regression analysis, these results suggest that R&D intensity in the two related categories is essentially the same in the firms studied, a finding generally supportive of Hypothesis 2 because R&D intensity is significantly higher in the dominant-business category relative to the intercept (related-linked), and the unrelated category is significantly lower than the intercept in R&D intensity. Support for Hypothesis 2 is only qualified by the fact that R&D intensity for related-constrained firms is not significantly different from that for related-linked firms (intercept). Moreover, the other covariates are all statistically significant and have the anticipated signs.⁷

Results for a one-way analysis of variance (not shown in any table) suggest support for the hypotheses ($F_{3,967} = 13.36, p < .01$). Table 5 displays results of an analysis of covariance, which provides a much more conservative test of the hypotheses. The overall model was statistically significant ($F = 36.36, p < .0001$), with an R^2 of .23. Figure 2 shows the mean levels of R&D intensity by strategy type adjusted for the influence of the covariates. It

⁷ The same analysis with R&D spending per employee as the intensity measure produced equivalent results. This was the case for all the results reported below.

TABLE 5
Results of Overall Analysis of Covariance for the Relationship
Between Strategy Categories and R&D Intensity

Source	<i>F</i>
Strategy categories	11.42**
Covariates	
Technological opportunity	163.39**
Current ratio	11.95**
Debt/size	9.26**
Size	5.46*
Concentration	5.26*
Overall model	36.36**
$R^2 = .23$	

* $p < .05$

** $p < .01$

is readily apparent from the modeling that R&D intensity is lower in more diversified multidivisional firms, providing general support for the hypotheses.

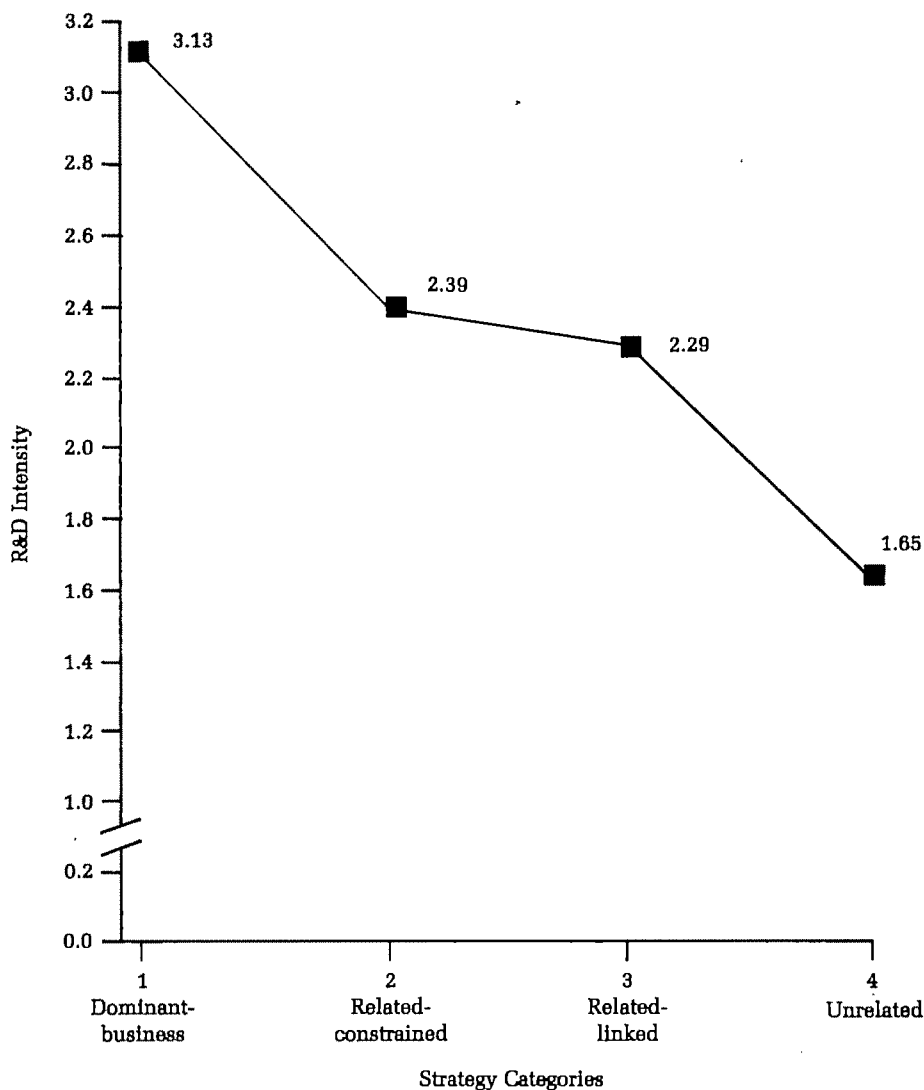
DISCUSSION

The results reported above reveal that the average intensity of spending on research and development differs, all else being equal, across firms with different diversification strategies. Although these results tend to support the hypotheses examined in this research, it also may be possible that firms engaging in unrelated diversification strategies happen to do so by entering industries that are less R&D intensive. To test that idea, we examined the interaction between the diversification categories and our technological opportunity variable. Although previous research (Bettis, 1981) has suggested that a similar interaction may influence performance, none of the interactions in our analysis were significant. Therefore, although the present work cannot be considered conclusive, we appear to have interpreted the theory and the empirical results correctly.

However, as in previous work (Hambrick & MacMillan, 1985), the technological opportunity variable does explain the most variance in the model. Although the diversification variable explains little total variance, it is the second strongest variable in the model. Its strength suggests that strategic concerns emerge after firms set up environmental constraints through initial strategic choices. It also may suggest that further work be done in relating specific internal control attributes to managerial risk propensity.

Although we did not measure the internal control attributes of the various diversification strategies directly, the study's empirical results and theory development are generally in line with previous research on corporate strategy and business-level strategy implementation. In one such study, Burgelman examined the role played by corporate managers in multidivi-

FIGURE 2
Adjusted Means for R&D Intensity by Strategy Category



sional firms and concluded that their "major contribution is precisely the manipulation of the structural context within which . . . [R&D] proposal generation takes place" (Burgelman, 1983b: 64). Bower's (1972) work on the role of top management in setting the direction of divisional decision making in diversified firms similarly suggested that corporate strategy defines the premises for divisional strategy. Our results thus fail to contradict previous theory suggesting that diversification strategies, internal M-form con-

trol systems, and managers' willingness to invest in research and development are related.

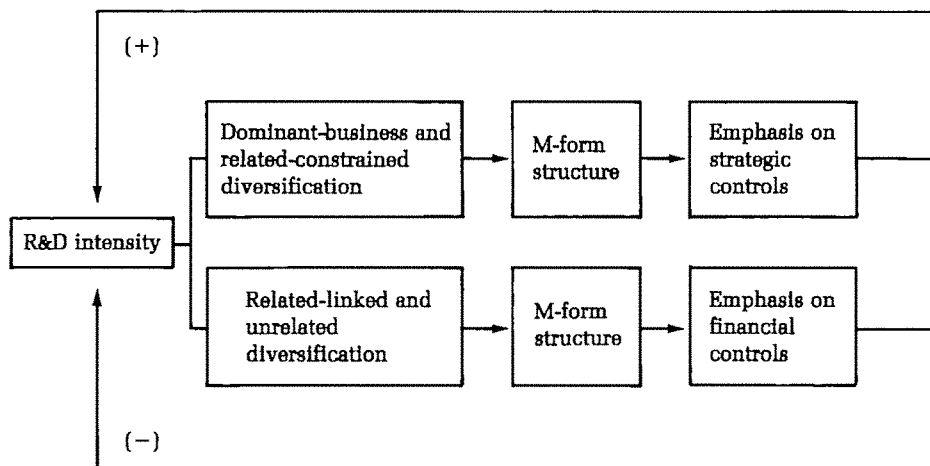
The results reported above also fail to contradict Gupta's (1987) conclusion that openness in corporate-SBU relations, and subjectivity in assessing divisional performance, facilitate division managers' willingness to give impetus to risky projects. Gupta's work was based on the information-processing perspective on organization design, according to which matching an organization's information-processing capacity with its information-processing requirements enhances organizational effectiveness (Egelhoff, 1982; Galbraith, 1973; Hill & Hoskisson, 1987; Tushman & Nadler, 1978). From that perspective, corporate managers interested in encouraging aggressive proposals requiring investments in research and development should pursue dominant-business or, at most, related-constrained diversification strategies. Firms that adopt more highly diversified strategies and find it necessary to implement them with a greater emphasis on financial controls may expect R&D spending to be reduced in their component divisions.

Of course, we only tested the cross-sectional nature of the relationship between diversification and R&D intensity. Consequently, it may be that R&D intensity influences diversification. Economic research, as we noted earlier in this article, has posited a positive association between R&D and diversification (Link & Long, 1981; Nelson, 1959; Penrose, 1959), and strategic management research has predicted that R&D intensity will follow as a consequence of diversification owing to the economies of scope and enhanced R&D efficiency diversification allows (e.g., Hambrick & MacMillan, 1985). Since our results indicated that R&D intensity and diversification are inversely related overall, it is important to square these results with previous theory.

As discussed in the introduction, in the early post-World War II era firms may have diversified in order to exploit excess technological resources, so analysts have predicted a positive association between diversification and R&D intensity (Nelson, 1959; Penrose, 1959). Others have argued that diversification strategies are implemented through the adoption of M-form structure and controls (Chandler, 1962; Galbraith & Kazanjian, 1986; Rumelt, 1974; Williamson, 1975). Williamson further argued that increased R&D spending may follow the adoption of M-form structure and controls to the extent that an internal capital market system enhances division managers' tolerance for risky strategies (Williamson, 1985). From this perspective, early research and development efforts lead to diversification, which leads to M-form structure and controls and, hence, to more R&D spending.

Others, however, have maintained that the implementation of diversification strategies using M-form structure and internal controls may actually discourage risk taking and lead managers to subordinate long-term investment in research and development to more immediate performance objectives (Burgelman, 1983a, b; Hayes & Abernathy, 1980; Hill, Hitt, & Hoskisson, 1988). That is, diversification, whatever the cause, leads to M-form structure and controls, which then lead to risk averseness manifested in

FIGURE 3
Diversification Strategy, M-form Controls, and R&D Intensity



reduced R&D intensity. Figure 3 summarizes these perspectives and attempts to illustrate how future research may reconcile them.

The figure suggests that the particular effects of alternative internal control strategies operating in M-form firms may moderate the relation between diversification strategy and R&D intensity. Early in the history of multidivisional structures, firms exploited excess technological resources through diversification. To implement diversification, firms adopted M-form structures and established the requisite internal control strategies. Firms that chose to limit diversification to dominant-business and related-constrained strategies appear to have been able to use information processing and control strategies that favored risk taking at a divisional level; firms that went on to become related-linked and unrelated diversifiers shifted their emphasis from strategic controls to financial controls. Recent research in strategy implementation (e.g., Hoskisson & Hitt, 1988) has suggested that such a shift in control emphasis inhibits risk taking. Figure 3 thus attempts to illustrate the need to consider diversification strategies and associated controls when assessing the relation between diversification, M-form structure, and R&D intensity in large multiproduct firms.

IMPLICATIONS FOR FUTURE RESEARCH

In assessing the type of corporate diversification strategy a firm implements, Williamson suggested that it is important to consider issues of both "efficiency, with respect to a given goal, and effectiveness, with respect to the choice of goals" (1975: 132). The research presented here tends to support this view. Firms implementing related-linked and unrelated strategies may maintain their efficiency in terms of production and information costs but may induce short-term, risk-averse behavior at the division level

in the process. Intense R&D seems to be the specialty of dominant-business and, to some degree, related-constrained firms. In such organizations, it may be easier for top management to reward division managers on the basis of both the quality of their strategic decisions and the outcomes of those decisions. Establishing whether that is the case is a worthy objective for future empirical research.

An additional implication of the study is that neither support nor criticism of the M-form structure is appropriate without due consideration of the effects of corporate diversification strategy. This institutional arrangement should not necessarily be singled out as an important structural cause of the short-term orientation of U.S. management and reduced U.S. competitiveness. Rather, it may be that corporate strategies, structures, and internal controls entail trade-offs. In this regard, it is especially important to note that the controls influencing R&D intensity in large, diversified firms may be directed at managing diversification rather than innovation. Efforts to understand recent developments in the performance of U.S. business firms may benefit from taking that likelihood into consideration.

Finally, because this archival research uncovered a negative relation between diversification and R&D intensity, the obvious next step should be a field study that provides measures of the control system attributes that apparently map into the various approaches to diversification.

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Barry Baysinger is an associate professor of management in the College of Business Administration at Texas A&M University. Professor Baysinger received his Ph.D. degree in economics from the Virginia Polytechnic Institute and State University. His research interests include organizational economics, strategy implementation, and organizational design.

Robert E. Hoskisson is an assistant professor of management in the College of Business Administration at Texas A&M University. He received his Ph.D. degree in management from the University of California, Irvine. His current research interests include the relationship between multidivisional structural controls and performance and managerial commitment to innovation.

STRATEGIC GROUP DYNAMICS

BRIANCE MASCARENHAS
New York University

A longitudinal study was conducted of strategic group dynamics over periods of economic stability, growth, and decline in international offshore oil-drilling. Some changes in group strategy were observed during economic growth and decline. Mobility rates among groups were observed to be higher during economic decline than during stability or growth; mobility was also higher between similar groups than between dissimilar groups. The number of groups remained to a large extent the same for an extended period, with the formation of only one additional group. The conditions leading to the formation of this new group are documented.

Most studies of strategic groups have employed static analysis and implicitly assumed that groups are a stable element of market structure. With static analysis, however, research cannot examine if in fact groups are stable over time or investigate fundamental questions about group formation, evolution, and types of change.

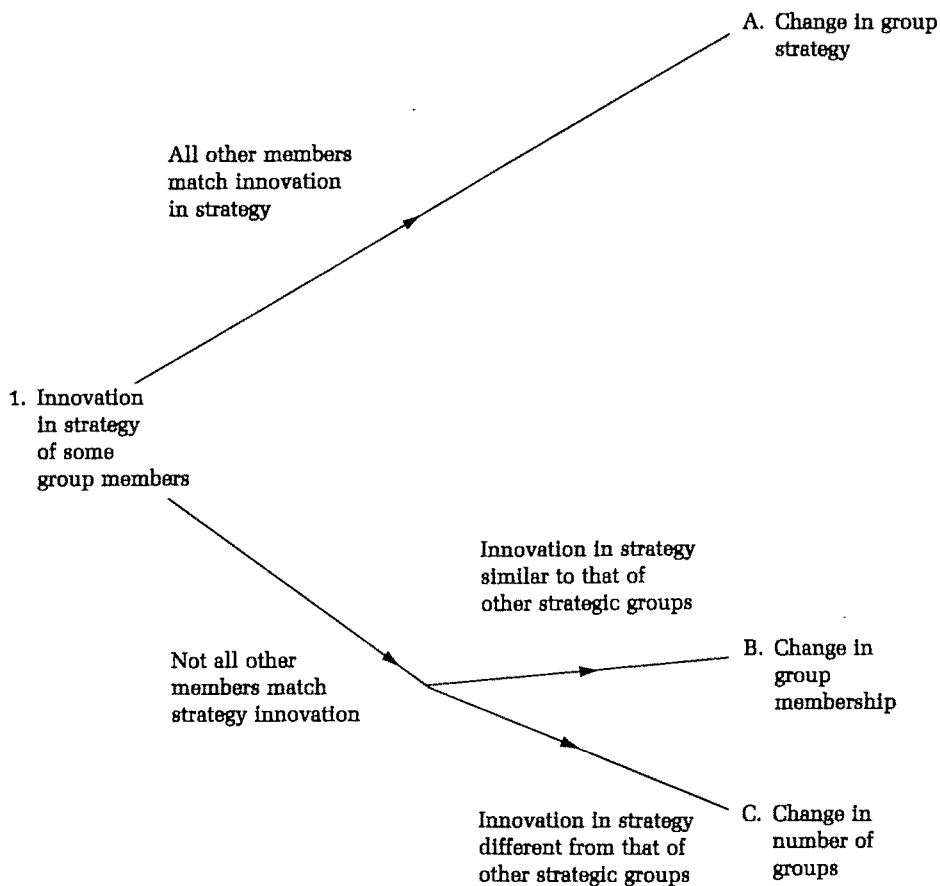
Dynamic analysis, which examines change over time, may prove valuable for the analysis of strategic groups. First, a dynamic analysis can verify whether or not an equilibrium exists and can assess the sensitivity of findings to diverse conditions (Tuma & Hannan, 1984). Static approaches, in contrast, implicitly assume that relationships are unchanging and emphasize equilibrium, so they may be misleading when those conditions do not hold. Second, dynamic analysis can provide additional insights through an examination of the events preceding an outcome. It is difficult to develop such an understanding by examining only contemporaneous data.

ANALYTICAL FRAMEWORK

A prerequisite for analyzing strategic group dynamics is the development of a framework of analysis. The framework detailed in Figure 1 suggests that an initial strategy change by some firms in a group can result in three different outcomes: a change in group strategy, a change in group membership, or a change in the number of groups. Which outcome emerges is based on (1) whether other group members match an initial change in

The study has benefited from the comments of Charles Fombrun, Stephen Kobrin, Thomas Pugel, Ruth Raubitschek, William Starbuck, and the *Academy of Management Journal's* reviewers.

FIGURE 1
Relationships Among Changes in Firm Strategy, Group Strategy,
Group Membership, and Number of Groups



strategy by some firms in a group and (2) whether the revised strategy is similar to that of other strategic groups.

Some firms in a strategic group may change their strategy. If all other members of the group match the change in strategy the result will be a change in group strategy. In the present context, group strategy refers to the strategies of all members of a group and not to a collusive strategy at a group level. Strategies of group members may not be identical. If an initial change results in a strategy that parallels the strategy of another strategic group and if all the other members of the initial group do not follow, group membership shifts occur. Finally, if the initial change does not result in a strategy that coincides with the strategy of another existing strategic group and if not all other members match the strategy change, an additional strategic group will

be formed. The processes that may generate these three outcomes are examined in turn.

Change in Group Strategy

An analysis of changes in group strategy constitutes what Starbuck (1976) termed the "anatomy of conformity." Changes in group strategy may occur under conditions of economic stability, growth, and decline. Central debates in the literature concern the extent to which populations are stable and the extent to which environments determine organization adaptation (Astley & Van de Ven, 1983).

According to the population ecology perspective, populations of organizations are largely stable (McKelvey, 1982), and organizations are mostly unadaptable because of constraints in their founding technologies (Astley, 1984) and because environmental changes select particular organizations rather than promote adaptation. This view would suggest that few changes in group strategy occur.

According to the adaptation perspective, in contrast, organizations are, in fact, adaptable and try to adapt to environmental changes (Meyer & Rowan, 1977). Similarly, the traditional Mason-Bain industrial economics paradigm (Bain, 1968) holds that industry structure drives firms' conduct and performance (Porter, 1981). Environmental change, such as economic growth or decline, may result in misalignments between an organization and its environment, reducing the effectiveness of its current strategy (Porter, 1980) and may precipitate strategy changes intended to improve alignment (Friesen & Miller, 1986). The adaptation and industrial organization economics perspectives suggest that environmental shifts drive strategy changes that may result in changes in group strategy.

Population ecology, organizational adaptation, and traditional industrial organization economics, however, all reflect a deterministic approach. They thus ignore strategic decision makers' likely choice of enacting or interpreting different environments (Starbuck, 1982; Weick, 1979) and organizational power-holders' discretion in courses of action or ability to influence their environment (Bourgeois, 1984; Child, 1972; March, 1981).

In the pharmaceuticals industry, for example, Cool and Schendel (1987: 1120) observed group strategy changes and attributed them to both exogenous discontinuities and endogenous initiatives. Similarly, Tushman and Anderson (1986: 463) suggested that technology advances through competition between alternative technologies promoted by rivalrous organizations. And Bourgeois (1985) observed no relationship between environmental volatility and number of organizational goals, an indicator of adaptiveness, suggesting that there may be discretion in adapting.

All the perspectives discussed allow for group strategy changes but differ as to the suggested extent and source of such changes. Thus, the first research questions investigated were: (1a) To what extent do groups change

their strategy across periods of economic stability, growth, and decline? and (1b) What factors motivate changes in group strategy?

Change in Group Membership

Performance differences, possibly related to economic conditions, may affect the level and type of firms' search activities, which may result in changes in firms' domains and intergroup shifts. Unfavorable performance encourages firms to undertake solution-driven or survival search activities, and favorable performance encourages slack-driven search (March, 1981). Survival search is more focused and problem-oriented and involves more risk-taking than slack search, which involves unfocused dabbling in new and untried activities (March, 1981). As the performance of a firm improves, slack-driven search partially replaces solution-driven search, so the relationship between firm performance and composite search (solution-driven search plus slack-driven search) may be U-shaped, higher at low- and high-performance levels than at intermediate performance levels (Hrebiniak & Joyce, 1985).

Economic conditions may also affect entry into groups. Entry may be more difficult when industry conditions are stable and the bases of competitive advantage are not changing (Hergert, 1983). Although entry may be easier during growth, when existing firms are not exploiting sales opportunities rapidly enough (Duetsch, 1975), firms have no compelling need to search for a new domain under conditions of growth (Hofer, 1975). Decline, however, may motivate survival search, which may result in changes in domains and in group membership. During economic decline, the market prices of inputs may be low because availability is high. Thus, the ability to achieve a cost advantage through levels, mixes, or prices of inputs that are superior to those of existing firms tied by prior contractual arrangements may encourage new entrants. Further, existing firms with a goal of short-term profit maximization and no unit-cost advantage over potential entrants may set prices at entry-attracting levels, even though doing so results in losses of market share over time (Scherer, 1977).

Hypothesis 1: Firm mobility will be higher during periods of economic decline than during periods of economic stability or growth.

Caves and Porter (1977) conjectured that entry into some groups may be easier than entry into others because of differences in the mobility barriers to overcome. Oster (1982) observed that membership shifts were asymmetrical between groups possibly because of such mobility barrier differences. If movement into groups with fewer mobility barriers to be overcome is easier, mobility rates may be higher between similar groups. This pattern may occur partly because firms are more likely to engage in incremental change, involving movement into similar groups, than in major or quantum change, involving movement into dissimilar groups.

Hypothesis 2: Mobility rates will be higher between similar groups than between dissimilar groups.

Changes in the Number of Strategic Groups

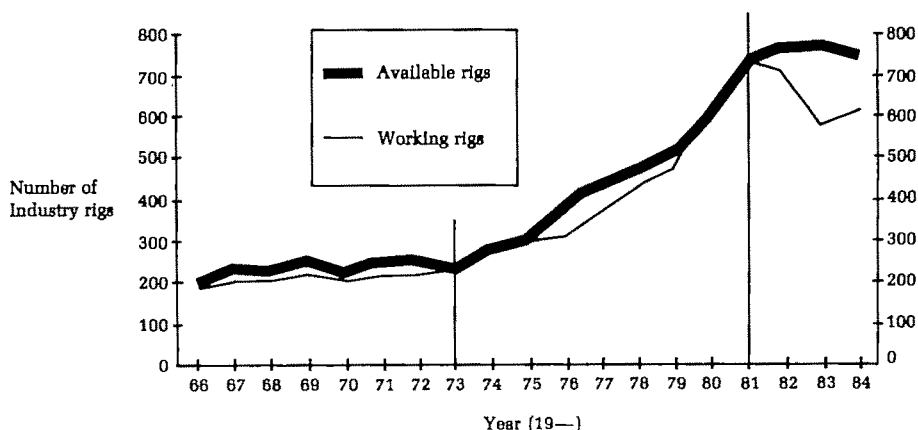
It is not clear, and admittedly difficult to determine, if environmental changes or strategic choice causes changes in the number of strategic groups. Cool and Schendel (1987) observed that groups disappeared when members' strategies were no longer viable or when all members shifted to other groups. In the population ecology view, those two conditions suggest the presence of selection processes, and in the environmental adaptation tradition, they suggest systematic adaptation processes.

The strategic choice view, however, suggests that strategic decision makers may enact different environments (Weick, 1979) or various interpretations of environments (Starbuck, 1982). In other words, there is discretion in strategic options, and nonunique organizational solutions may accompany environmental changes (March, 1981). Conceivably, a group may be formed if one or more firms choose a new strategy that other firms choose not to follow or are unable to imitate and that does not parallel the strategy of an existing group. The details of why organizations copy one another sometimes but not at other times, however, are not well understood (March, 1981: 225). A new entrant with a different strategy may also form a group, particularly in the early stages of an industry's evolution. A second pair of research questions guiding this study were: (2a) Is the number of strategic groups stable over time? and (2b) How do strategic groups form or disappear?

METHODS

An in-depth analysis was made of firms engaging in international offshore drilling for the 1966–84 period. These firms, which provide drilling services to oil companies and national governments, are based in over a

FIGURE 2
Trends in Capacity and Capacity Utilization



dozen countries and have rigs scattered worldwide. Figure 2 shows the total number of industry rigs and the number of rigs working each year during the period.

Identifying Economic Periods

Two indicators were used to identify periods of economic stability, growth, and decline: capacity change, defined as the change in the number of industry rigs, and capacity utilization, defined as the proportion of total rigs that were working. These two indicators used jointly offer more insight than using either one alone because sometimes capacity expansion depresses utilization and capacity change at times has low responsiveness to economic activity when equipment is durable. For example, in an economic downturn, the number of rigs will not decrease readily.

Between 1966 and 1984, three distinct periods can be identified. A period of relative economic stability existed between 1966 and 1973; capacity levels were relatively stable, and some unused capacity existed. In 1973, however, with the Organization of Petroleum Exporting Countries' increase in oil prices, there began a growth period tied to the boom in exploration seeking to find new oil reserves. This boom, which lasted until 1981, is reflected in capacity growth or full capacity utilization during most of the period. Beginning in 1981, oil prices collapsed, which led to an industry decline, indicated by a leveling of capacity and low capacity utilization. Industry executives whom we interviewed confirmed these three basic periods and demarcation points.

Identifying Strategic Groups

Clearly, accurate and sensitive strategic group identification should be based on measures that are relevant to the industry being studied. I interviewed executives from ten firms, representatives of the industry trade association, analysts at five brokerage houses, and an independent industry consultant, in part to obtain suggestions for groupings of firms and variables and measures for group definition. The interviewed executives ranged from middle-level managers to firm presidents. The firms' fleets ranged in size from 1 to 39 rigs.

Variables reflecting important strategy dimensions and mobility barriers in this industry were chosen to define groups. These variables correspond approximately to the basic dimensions that previous research has suggested for defining a business: functions served, technology, vertical integration, and customer characteristics (Abell, 1980; Abell & Hammond, 1979). Descriptions of the group-defining variables, whose measures are shown in the Appendix, follow.

Product-line diversity. A wide product line reflects superior experience and enables a firm to market multiple products to its customers. There are, however, some impediments associated with broadening a product line: the foregone efficiencies of not specializing, the human and financial capital

requirements for offering additional products, and the uncertainty associated with new products.

Technological capability. Drilling is especially difficult and requires sophisticated skills and equipment in deep water where rigs cannot be bottom-supported and are very susceptible to wave movements and weather conditions. It is possible for firms to change their product-line diversity without changing their technological capability, and the two dimensions do not overlap closely.

Global spread. Firms expanding abroad have captured frontier-area drilling opportunities, and their geographically dispersed fleet may lower rig mobilization costs for new drilling locations. Going international, however, requires skilled employees who are willing to relocate, a capability for resolving problems scattered worldwide, and an ability to cope with foreign exchange risks and various local regulations.

Vertical integration. Drilling companies typically are independent, owned by an oil company, or owned by a national government. Each type of integration can retard or encourage particular initiatives. Oil company ownership, for instance, can provide funds and captive markets. A nonintegrated drilling firm, however, has greater flexibility in customer choice. State ownership can provide government contracts and subsidies at home; overseas, however, state ownership may weaken attempts to generate business from nongovernment or foreign government customers because they may see a firm owned by a foreign state as inefficient and under its home government's domination.

Marketing orientation. There are three basic types of customers in the oil-drilling industry: major oil companies, independent oil companies, and national oil companies. An indicator of a firm's espoused (as opposed to intended) marketing orientation is its customer type, since each customer type requires particular skills or assets. Efficiency and technical capability are required for dealing with major oil companies since, being large and impersonal, they generally hire contractors largely on the basis of technical and economic considerations. Personal relationships and loyalty are more important in dealing with smaller, independent oil companies. Dealing with state-owned enterprises requires effective agents with political contacts, negotiation skills, and long enough time frames to deal with delays caused by government bureaucracies; agents also need bartering skills when hard currency payments cannot be made because of balance of payments problems.

We obtained annual data on each firm's rig fleet generated by Offshore Data Services, a data service firm that monitors and tracks such characteristics as ownership, customer, and location for every industry rig. The data include information on the many firms that are privately held and based outside the United States. Offshore Data Services collects information from sales and operations executives of firms through telephone contact and regular mail questionnaires. The information service, though expensive, is considered reliable and is used extensively by industry firms, suppliers, and

customers. I observed no discrepancy when information on rigs from this source was cross-checked with data from annual reports of ten U.S. publicly traded companies.

Data Analyses

Table 1 shows the correlation matrix and descriptive statistics for the group-defining variables. Nonhierarchical cluster analyses of the firms were performed for the seven standardized variables with the nearest-centroid sorting method (Anderberg, 1973). The number of clusters specified ranged from one up to approximately one-fifth the number of observations. The procedure initially selects observations to be clusters' seeds to approximate cluster means. Observations are then assigned to the nearest seed with the objective of minimizing the within-cluster sum of the squared Euclidean distances. The seeds are then replaced by the means of the temporary clusters and the process repeated until no further changes occur in the clusters.

The cubic clustering criterion (Sarle, 1983) and pseudo-*F* statistic (Caulinski & Harabasz, 1974) were noted at each level of clustering. The cubic clustering criterion is an approximation to the distribution of the R^2 criterion based on the null hypothesis that the data are sampled from a uniform distribution on a hyperbox and that clusters are shaped like hypercubes (Sarle, 1983: 4). The peaking of the cubic clustering criterion and pseudo-*F*

TABLE 1
Pearson Correlations and Descriptive Statistics
for Group-defining Measures for 1984

Variables	Means	s.d.	1	2	3	4	5	6
1. Product-line diversity	1.44	0.77						
2. Technological capability	1.95	1.85	.21**					
3. Global spread	0.24	0.92	.39**	.17*				
4. Vertical integration: oil company	0.14	0.08	.30**	.20**	.22**			
5. Vertical integration: state	0.20	0.07	.06	.18*	-.09	.12†		
6. Marketing orientation: major oil company	0.23	0.05	-.02	.16*	-.02	.19*	-.14*	
7. Marketing orientation: national oil company	0.38	0.08	.13†	-.04	.13†	-.09	.42**	-.09

* $N = 123$.

† $p < .10$

* $p < .05$

** $p < .01$

statistic, indicators for identifying the number of distinct clusters present, suggested the presence of relatively tight clusters at the three-cluster level in 1966, 1973, and 1981 and at the four-cluster level in 1984. I also performed cluster analyses for the intervening years as a check on the stability of the cluster structure, observing similar patterns of tight clusters at the three-cluster level in those years. A distinct strategic group structure persisted for a long period of time, consistent with the findings of Cool and Schendel (1987).

The four strategic groups identified were checked for face validity with the interviewed executives, who felt that the groups were a meaningful representation of industry structure and could clearly identify their firm with a particular group. I also examined the group memberships of the interviewed executives' ten firms to identify group-defining variables. In 1984, two of the ten firms belonged to a group designated group 1, two to group 2, five to group 3, and one to group 4.

RESULTS

Characteristics of Strategic Groups

Table 2 details the characteristics of the strategic groups for 1984. The *F* and Tukey tests, of course, should be interpreted in the context of the groups' generation by cluster analysis.

Group 1 firms have a floating rig capability, a broad product line, and operations in numerous markets. Group 1 also has the highest proportion of firms owned by oil companies. Group 1 can be labeled multinational-multiproduct.

Group 2 is made up of firms that are less likely to have a floating rig capability than group 1 firms and that have a more moderate international scope and less product diversity than those firms. Smith and Grimm (1987) also observed a group of firms that was in the middle on all dimensions. They referred to this group as having a contingency strategy, as member firms appeared well-positioned to move in any direction.

Group 3 contains many firms with narrow product lines, operating locally instead of internationally. Few of these firms have a floating rig capability. This group can be labeled domestically oriented.

The characteristics and formation of the fourth strategic group will be discussed later.

Table 3 shows the trends in number of firms and rigs for each group. Most firm entries into the industry occurred during the growth period. During the period of decline, the number of firms also increased, as new companies entered by buying equipment at low prices from banks that had repossessed equipment from firms with financial difficulties. New state-owned companies also emerged worldwide.

Although the multinational-multiproduct and contingency strategy groups (groups 1 and 2) have fewer firms than the domestically oriented group (group 3), the former have firms that were consistently larger than

TABLE 2
Characteristics of Strategic Groups for 1984^a

Group-defining Variables	Group 1: Multinational- multiproduct	Group 2: Contingency	Group 3: Domestically oriented	Group 4: Sedco	F ^b	Tukey test ^c
Product-line diversity	3.40 (0.70)	2.31 (0.48)	1.16 (0.40)	3.00	102.08**	1,2,4 > 3; 1,4 > 2
Global spread	6.70 (0.95)	3.85 (0.90)	1.13 (0.76)	11.00	573.65***	1,2,4 > 3; 1,4 > 2; 4 > 1
Technological capability	0.70 (0.48)	0.46 (0.52)	0.16 (0.37)	1.00	8.33**	
Vertical integration: oil company	0.40 (0.52)	0.15 (0.38)	0.11 (0.32)	0.00	2.23†	
Vertical integration: state	0.00 (0.00)	0.15 (0.38)	0.23 (0.43)	0.00	1.17	
Marketing orientation: major oil company	0.32 (0.17)	0.28 (0.26)	0.21 (0.36)	0.36	0.43	
Marketing orientation: national oil company	0.16 (0.13)	0.29 (0.32)	0.42 (0.46)	0.33	1.37	

^a Means are shown, with standard deviations in parentheses. For groups 1-4, respectively, N = 10, 13, 99, and 1.

^b Degrees of freedom for all variables are 3, 119.

^c Groups are significantly different ($p < .05$) for Tukey's test in multiple comparisons of means.

† $p < .10$

** $p < .01$

*** $p < .001$

TABLE 3
Numbers of Firms and Rigs in the Strategic Groups Over Time^a

Years	Group 1: Multinational- multiproduct		Group 2: Contingency		Group 3: Domestically Oriented		Group 4: Sedco		Totals	
	Firms	Rigs	Firms	Rigs	Firms	Rigs	Firms	Rigs	Firms	Rigs
1966	6	48	4	63	31	64			41	175
1973	11	111	4	50	34	68			49	229
1981	13	154	9	288	88	276			110	718
1984	13	147	10	259	99	294	1	39	123	700

^a The average numbers of rigs per firm in 1984 for groups 1, 2, and 3 were respectively 11.31, 25.90, and 2.96.

those in group 3 in the average number of rigs for each year. Firms in groups 1 and 2 may be able to obtain scale economies, for example, in volume purchasing or in spare parts maintenance. Since expensive floating rigs composed a larger proportion of their fleets, group 1 and 2 firms were also larger than those in group 3 in average asset size, as the technological capability averages in Table 2 reveal.

Change in Group Strategy

Research question 1a concerned the extent of group strategy changes during periods of economic stability, growth, and decline. In order to detect changes in group strategy over time, I compared groups 1, 2, and 3 with themselves along the seven definitional variables for the years 1966, 1973, 1981, and 1984. There were a total of 21 (7×3) group dimensions in which possible changes could have occurred. I observed significant differences ($p < .05$) over time on three group dimensions using Tukey's test in multiple comparisons of means. The findings suggest that though changes in group strategy do occur, they do not involve most dimensions and all groups.

Table 4 shows the three group dimensions with the significant changes. Figure 3 shows broad trends for the three strategic groups over the periods of economic stability, growth, and decline with respect to these three group-defining variables. The figure is based on the levels of the variables at the beginning and end of the periods of interest. The changes may not be linear or uniform across the three periods.

During the period of stability, 1966–73, there were no significant changes in group strategy. By the end of the growth period, the multinational-multiproduct and contingency strategy firms (groups 1 and 2) had expanded internationally, possibly reducing intergroup competition for the same customers. By the end of the decline period, however, group 1 firms had retrenched geographically. During the growth period, group 1 firms had also widened their product lines, in part through the adoption of a new type of expensive rig, the semisubmersible, which permitted drilling in deep and agitated water where other rig types were incapable of operating.

TABLE 4
Significant Changes in Group Strategy^a

Groups	Variables	1966	1973	1981	1984	F ^b	Tukey test ^c
1: Multinational-multiproduct	Global spread	8.00 (1.41)	7.00 (0.82)	8.33 (1.22)	6.70 (0.95)	5.45**	81 > 84 81 > 66
1: Multinational-multiproduct	Product-line diversity	2.75 (0.50)	1.75 (0.50)	3.44 (0.53)	3.40 (0.70)	9.18**	81 > 73 84 > 73
2: Contingency	Global spread	3.17 (0.41)	3.91 (0.94)	4.46 (1.13)	3.85 (0.90)	2.72†	81 > 66

^a Statistics are means with standard deviations in parentheses.

^b Degrees of freedom are 3, 23 and 3, 35 for tests involving groups 1 and 2, respectively.

^c These years are significantly different with $p < .05$ for Tukey's test in multiple comparisons of means.

† $p < .10$

** $p < .01$

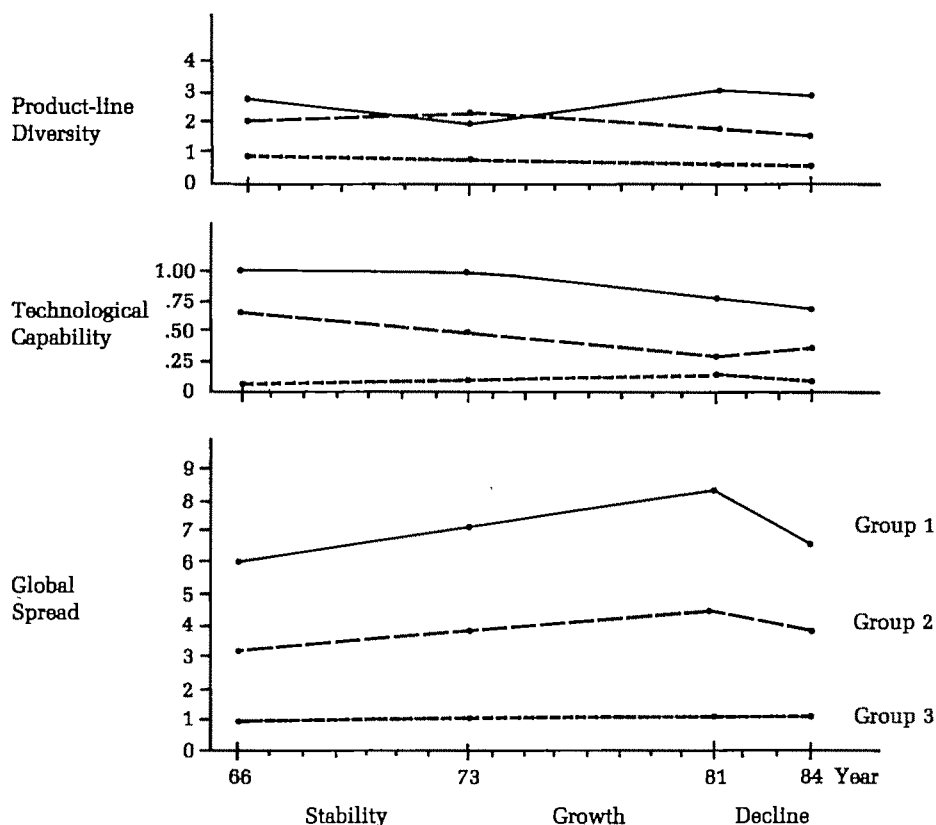
Research question 1b concerned the factors that motivate changes in group strategy. The increase in oil prices that began in 1973 raised worldwide demand for exploration services. Group 3 firms (domestically oriented) remained primarily local because state-owned firms in the group were closely regulated and had little freedom to initiate strategic changes (Mahon & Murray, 1981) and had to negotiate any strategic changes with political constituents (Mazzolini, 1979; Murray, 1978). The small size of many group 3 firms also constrained their ability to investigate foreign markets and reduced their visibility to and credibility with foreign clients.

In contrast, group 2 and 3 firms in general did expand internationally. Monitoring and imitating was easier for firms in groups 2 and 3 because there were fewer members to monitor, because the trade press was more likely to cover large firms, and because the firms were more likely to encounter one another in several locations worldwide.

A subtle, reciprocal dynamic relationship may have existed between international spread and product-line diversity. By expanding internationally, firms developed market expertise that they could potentially use for leverage over a wider product line and the new high-cost product, the semi-submersible rig. A wider product line, in turn, could facilitate international expansion to the extent that start-up costs in a new market could be spread over more products. Also, having a broad product line increased the chances that a firm would have the right product for the particular operating conditions in a country.

During the industry decline following 1981, group 1 firms reduced their geographical spread. Some of the marginal, difficult-to-drill new areas into which group 1 firms had expanded were the first to turn economically infeasible, and operations in those areas were cut back. Although some rigs belonging to group 1 firms became idle, these firms sometimes managed to

FIGURE 3
Trends in Strategic Groups



find work for their rigs, which were largely mobile, in other locations where they had market expertise and presence.

Despite these general group trends, there was intragroup variation reflecting differences in strategic choice. Although some companies did expand aggressively in the boom period, others were more cautious. For example, both Global Marine and Odeco belonged to group 1. Global Marine's chief executive, Russell Luigs, pursued aggressive expansion with high-priced rigs and leverage during industry growth, believing that the boom would persist or that even if it did not, the firm's new fleet would have an edge in obtaining contracts during industry decline. Odeco's chief executive, Hugh Kelly, in contrast, opted for limited expansion and accumulation of cash during industry growth, with the intention of buying rigs during industry decline at lower prices from competitors or rig manufacturers in financial difficulty. During industry decline, Odeco expanded its fleet, but

Global Marine was unable to meet its debt obligations and filed for bankruptcy protection.

Change in Group Membership

Cluster analytic assignment of a firm to a different group than it had been in during the prior year defined a membership shift. Table 5 shows the membership shifts, measured year to year, during the economic stability, growth, and decline periods.

Hypothesis 1 suggested that the mobility rate in the decline period would be higher than it was in the stable or the growth period. Using Tukey's test, I performed multiple comparisons of adjusted mobility rates during the three periods. The evidence is consistent with Hypothesis 1: the mobility rate in the period of decline is higher than it is in either the stable or the growth period ($p < .01$). Further, the mobility rates in the stable and growth periods are not significantly different from each other at the .05 level. Interviewed managers mentioned that although a favorable period might generate firm resources that would facilitate intergroup movement, managers have little incentive to change groups, particularly when their present environment is favorable.

Table 6 details the strategic groups of origin and destination for the membership shifts. Mobility rates are not symmetrical within pairs of groups, consistent with Oster's (1982) findings.

Hypothesis 2 suggested that rates of mobility would be higher between relatively similar groups. As the descriptive statistics in Table 4 suggest, group 2 (contingency strategy) more nearly resembled group 1 (multinational-multiproduct) and group 3 (domestically oriented) than groups 1 and 3 resembled each other. To test this hypothesis, I compared the mobility rate between similar, adjacent groups (groups 1 and 2 and groups 2 and 3) to the mobility rate between the less similar groups (groups 1 and 3).

Observed each year, each firm was a member either of the same group as in the prior year or of another group. Thus, there could be at most one shift per year per firm, though there was more than one group into which a firm could move. There were 104 ($24 + 34 + 15 + 31$) shifts between similar groups (groups 1 and 2 or groups 2 and 3) out of a maximum observable

TABLE 5
Group Membership Changes

Changes	Stable Period 1966-73	Growth Period 1974-81	Decline Period 1982-84
Possible membership changes (1)	431	893	345
Actual membership changes (2)	24	47	36
Mobility rate ^a (2/1)	0.05	0.05	0.10

^a The hypothesis of equal mobility rates across periods was not supported ($F = 6.75$, $df = 1, 877$, $p < .01$). In multiple comparisons of means with Tukey's test the decline period's mobility rate was significantly different from those of the stable and growth periods ($p < .05$).

TABLE 6
Shifts Between Strategic Groups of Origin and Destination

Shifts	Group 1 to Group 2	Group 1 to Group 3	Group 2 to Group 1	Group 2 to Group 3	Group 3 to Group 1	Group 3 to Group 2
Number of shifts (1)	24	0	34	15	2	31
Possible shifts from origin group (2)	206	206	129	129	1,211	1,211
Adjusted mobility rate (1/2)	.117	.000	.264	.116	.002	.026

1,546 (206 + 129 + 1,211) shifts, yielding an adjusted mobility rate of 0.067 (104/1,546). In contrast, there were 2 (0 + 2) shifts between the less similar groups out of 1,417 (206 + 1211) possible shifts, yielding an adjusted mobility rate of 0.001 (33/1211). Consistent with the hypothesis, the adjusted mobility rate between relatively similar groups is higher ($p < .01$) than that between less similar groups, in terms of Tukey's test. The relative similarity between strategic groups is related to the entry barriers that firms need to overcome to move between groups. For example, it is more difficult for a firm to move from group 3, the domestically oriented group, to group 1, the multimarket-multiproduct group, than it is for a firm from group 2, the contingency group, to move to group 1. In particular, the former move requires large resource commitments to expand product line and an international scope that may be beyond the means of most small firms in group 3.

Change in Number of Groups

Research question 2a concerned stability in the number of strategic groups. As was noted, during most of the period the number of groups was stable. A fourth strategic group emerged in 1984, however, composed of one firm, Sedco, which was originally in group 1. Porter (1980) noted that one firm may create a strategic group. Table 2 details the descriptive characteristics of the member: a very extensive international presence, a broad product line, floating-rig technological capability, and independent ownership.

Research question 2b concerned the nature of group formation or disappearance. During the industry downturn, other members of Sedco's original group retrenched geographically, as operations in the new overseas exploration areas were the first to be cut back. Geographic consolidation potentially increased intragroup and intergroup market competition. Most group 1 firms, however, were owned by oil companies and thus had a captive customer, particularly in the home market, which could serve as a buffer. In contrast, interviews and annual reports suggested that Sedco, because of its independent status, would have been at a relative disadvantage if it followed other members of its group.

Sedco's chief executive, Bill Clements, a strong-willed leader who had been governor of Texas, may have been instrumental in orchestrating an organizational change and rebelling against the firm's group trend. With its new strategy, Sedco was repositioned in an industry area with less competition, operating in Third World countries using expensive, severe-environment rigs.

This posture, however, was potentially precarious because of political risks and high capital costs for the equipment used. But Clements's political experience may have proven valuable in coping with these political risks and red tape. The firm may also have reduced risks by entering into joint ventures with customers owned by oil companies and foreign states; these joint ventures provided capital, market access, and long rig contracts that assured the recovery of capital costs. The joint ventures reduced political risks when a local partner was involved or when it became apparent to the host governments that, should they intervene, they would have to contend with many joint venture partners (Sedco and its oil company customers) from different countries. Drilling companies captively owned by oil companies had neither the need for this strategy nor the ability that Sedco's independent, flexible status gave it to make joint venture linkages with many oil company customers. Further, joint ventures permitted entry into several small, new markets that were really niches. Sedco maintained a higher financial performance than many members of its original group.

CONCLUSIONS

A longitudinal study of strategic groups was conducted to examine questions seldom addressed by static analyses, about group strategy change, group membership shifts, and group formation. The study examined the extent of and motivation for group strategy changes during periods of economic growth, stability, and decline. Changes in group strategy were associated with substantial environmental shifts involving growth and decline rather than economic stability, consistent with the adaptation perspective. As the population ecology view suggests, however, these changes in group strategy did not involve most dimensions and all groups. Further, there was evidence that strategic choice was an important variable. For example, the group consisting mostly of state-owned and small firms did not exhibit an increase in internationalization, as did the firms in the other groups. The close regulation of state-owned firms and the limited resources, visibility, and credibility of the smaller firms may have constrained their "zone of strategic discretion" (Murray, 1978: 960). And even when group strategy changed, there was evidence of intragroup variation. In fact, a contrarian strategy involved opposing group trends. The population ecology, environmental adaptation, and strategic choice perspectives should not be viewed as competing and mutually exclusive but as complementary. The evidence shows how the different perspectives can coexist and provide a richer and more accurate account when employed jointly than when employed sepa-

rately. Research designs that are attentive to both organization conformity and deviance are needed. (Bourgeois, 1984).

Changes in group membership were less frequent during times of economic stability and growth than during decline. Economic stability may be associated with few search activities and low mobility. During economic growth, although market entry from outside the industry was high, little intergroup mobility was observed, possibly because under conditions of growth, search is slack-driven and unfocused. Such search involves less risk-taking (March, 1981), less consensus on goals within organizations (Bourgeois, 1985), and less radical strategic initiatives than do other types of search. A boom may also contribute to behavioral institutionalization of existing practices (Starbuck, 1982) and to the preservation of existing domains (Hofer, 1975). Mobility rates were higher in the downturn, however, possibly because of high levels of goal consensus (Bourgeois, 1985) and of solution-driven search, which involves a focus on survival and high risk-taking (March, 1981). The sudden reversal of the boom by a severe downturn may also have magnified the perception of the crisis and motivated a radical strategic change.

Mobility was also higher between less protected, similar groups. Movement into these groups required overcoming relatively few barriers. By implication, managers should expect and take precautions against entry from relatively similar groups.

After a long period of stability in the number of groups, the study detected the formation of an additional strategic group. Group formation appeared to be a creative response to increasing intra- and intergroup competition. A powerful leader headed the group-creating firm. The strategic initiative taken by this firm was a rebellion against detrimental environmental trends. Because the firm was in a position different from that of other members of its original group, its managers were reluctant to imitate the strategy changes of firms in its original group. The strategy the firm chose encompassed an unexplored industry area, went against the trend of the firm's original group, and was not desirable for or easily imitable by all competitors. The special political experience of its leader contributed to the firm's ability to orchestrate an organizational change and to cope with its politically risky new environment.

Environment and industry structure, therefore, may not totally determine strategy changes: strategic choice and individual firm characteristics play an important role. Nonunique organizational solutions can accompany environmental shifts (March, 1981) because of variations in environment enactment and strategic choice (Weick, 1979). These nonunique solutions to an environmental situation may lead to the formation of new strategic groups that feed back into and change industry structure, completing the cycle. Strategic decision makers should not consider their industry's structure as a given: through specific strategic initiatives, they may be able to change that structure.

The study's data and findings are based on one industry but may be

relevant or generalizable to some other industrial contexts with similar basic characteristics. One relevant basic characteristic is volatility in economic conditions caused by discontinuous events like cartel formation and wars. Supply and demand imbalances due to, for example, large and durable capacity additions, a service product that cannot be stored, or the existence of numerous firms impeding interfirm coordination may also cause volatility in economic conditions. Another relevant basic characteristic is industry internationalization. If international expansion is associated with difficulties and is not a feasible or attractive option for all industry firms, groups of internationally oriented and domestically oriented firms are likely to arise. A third characteristic promoting comparability with the present study is the importance of an industry to governments for reasons of security, prestige, self-sufficiency, or control. If an industry is important in such ways, government involvement may be pervasive in state ownership and procurement. Industries that are profoundly affected by discontinuous economic conditions, internationalization, and state involvement include shipping, airlines, banking, re-insurance, aircraft manufacture, shipbuilding, and extraction of metals, minerals, and coal.

In industries with those characteristics, the industrial context may dominate strategic group formation and change. It should be invaluable to examine strategic group dynamics in less dominating industrial contexts. The distinction and methodological delineation between strategic groups and industries are other areas that need attention. Much strategic group research has been data-driven. The present study has illustrated how organization theory may provide a promising framework for examining strategic groups.

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APPENDIX

Measures of the Group-defining Variables

Product-line diversity. The number of different rig types owned by a firm. There are four rig types: barges and jack-ups, which are bottom-supported, and semisubmersibles and drillships, which drill while afloat and are mobile. The maximum possible value for product diversity was 4.

Technological capability. A dummy variable equal to 1 if a firm had semisubmersible rigs or drillships, and 0 otherwise.

Global spread. The number of regions in which a firm had rigs working. There are 17 major offshore drilling regions around the globe. The maximum possible value for global spread was 17.

Vertical integration. Two dummy variables were used to capture the three types of integration: (1) the oil-company dummy variable was equal to 1 if a drilling firm was owned by an oil company and 0 if it was independent or owned by a national government; (2) the national-government dummy variable was equal to 1 if a drilling firm was owned by a national government and to 0 if it was independent or owned by an oil company.

Marketing orientation. A firm's espoused marketing orientation had two measures: (1) the proportion of a firm's rig fleet contracted out to major oil companies, as opposed to national or independent oil companies; (2) the proportion of a firm's rig fleet contracted out to national oil companies, as opposed to major oil or independent oil companies.

Brian Mascarenhas (Ph.D., University of California, Berkeley) is an associate professor of international business and management at New York University. His research interests include international business strategy, innovation and international competition, strategy under uncertainty, and strategic groups.

ORGANIZATIONAL DEMOGRAPHY: THE DIFFERENTIAL EFFECTS OF AGE AND TENURE DISTRIBUTIONS ON TECHNICAL COMMUNICATION

TODD R. ZENGER

BARBARA S. LAWRENCE

University of California, Los Angeles

Although previous researchers have proposed organizational demography as an important determinant of communication, no one has tested this relationship directly. Further, distinctions between the impacts of different demographic variables on communication have not been explored. This study used sociometric data collected from a U.S. electronics firm to examine such relationships. The results show a relationship between age and tenure distributions and the frequency of technical communication. Moreover, the results suggest that inside project groups, age distributions exert greater influence than tenure distributions on the frequency of technical communication but that the reverse relationship holds for technical communication outside project groups.

The literature suggests that an organization's demographic composition influences communication because people tend to communicate with those who are similar to themselves (Kanter, 1977; Pfeffer, 1981, 1983; Simmel, 1950). Although this explanation has been applied to a variety of important outcomes, such as turnover (Wagner, Pfeffer, & O'Reilly, 1984) and performance ratings (Tsui & O'Reilly, 1989), little empirical evidence exists for the connection between organizational demography and communication frequency. O'Reilly, Caldwell, and Barnett's (1988) recent examination of the relationship between demography and employees' perceptions of work group integration supported the existence of this connection. However, that study did not directly assess communication frequency. Further, to our knowledge, no work on organizational demography has examined the potentially differential effects of various demographic variables on communication frequency. Researchers generally characterize organizations as demographically homogeneous or heterogeneous, employing either a single demographic variable or a set of demographic variables. Yet there is no a priori

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reason to believe that age, race, and tenure exert the same influence on the frequency of communication. The current study served two purposes. First, within an organizational setting, we examined the relationship between age and tenure similarity, the two most frequently discussed demographic variables, and communication frequency. Second, we tested hypotheses concerning the differential impacts of those demographic variables on communication inside and outside project groups.

THEORY

Organizational Demography, Technical Communication, and Performance

Research and development organizations provide a particularly appropriate setting for examining the factors that influence communication. Oral communication with individuals inside and outside project groups is the primary medium through which engineers and scientists transfer technical information (Allen, 1977). Such communication permits individuals to synthesize complex ideas rapidly and to give one another immediate feedback. Thus, this method of communication provides an efficient medium for the transfer of information and ideas (Mintzberg, 1973; Myers & Marquis, 1969; Tushman, 1978). Not surprisingly, numerous studies have confirmed a relationship between oral communication and project performance in R&D laboratories (cf. Allen, 1970; Katz, 1982; Pelz & Andrews, 1976; Rubenstein, Chakrabarti, O'Keefe, Souder, & Young, 1976). Although the exact nature of the relationship between this mode of technical communication and project performance depends on factors such as task and project type (Chakrabarti & O'Keefe, 1977; Katz & Tushman, 1978; Tushman, 1978), studies have generally agreed that frequent communication from at least some project group members to colleagues both inside and outside their project group is vital to high project performance.

The positive association between technical communication and project performance indicates the importance of designing internal structures in research and development organizations that facilitate technical communication. Yet, aside from that provided by studies of task characteristics and physical proximity (Barnlund & Harland, 1963; Hackman, 1968; Katz & Tushman, 1979; Tushman, 1978), little evidence exists on the determinants of technical communication. Pfeffer (1981, 1983) suggested that the distribution of employees in an organization along some demographic dimension such as age, tenure, or gender influences communication frequency and thus produces organizational outcomes. In universities, for example, time gaps between adjacent faculty hires create "lumpy" tenure distributions. As these gaps increase, communication between different tenure groups becomes more difficult; the process isolates particular groups, encourages conflict and power struggles, and hence promotes more voluntary resignations than might otherwise occur (McCain, O'Reilly, & Pfeffer, 1983). If organizational demography does influence the frequency of communication, the demo-

graphic attributes of organizations, because they are easily measured and in some cases easily altered, may provide project and human resource managers with a useful tool for facilitating high performance in research and development organizations.

Communication Frequency and Demography: Age and Tenure

March and Simon (1958) proposed that the frequency of communication between two employees increases with the efficiency or ease of communication. Related research has suggested that the presence of a shared language or coding scheme determines the efficiency of communication (Allen & Cohen, 1969; Dearborn & Simon, 1958; Katz & Kahn, 1966; Newcomb, 1953; Runkel, 1956; Triandis, 1960; Tushman, 1978). A language shared among the members of a group reflects similarities in how they interpret, understand, and respond to information. Individuals unfamiliar with this shared language are likely to distort and misinterpret information received from group members and thereby to find communication with group members difficult (Barnlund & Harland, 1963; Rogers & Bhowmik, 1971).

Within organizations, the development of a shared language between employees results at least in part from their similar backgrounds and experiences. The experiences employees share inside organizations produce a common vocabulary and common interpretations of events that facilitate work-related communication (Allen & Cohen, 1969; Lawrence & Lorsch, 1967). Employees' shared familiarity with a successful, previously completed project, for instance, contributes to a common vocabulary and understanding of current work. In contrast, the background and experiences employees share outside organizations create a shared language concerning a wide spectrum of non-work-related issues by influencing employee attitudes, interests, and beliefs (Rhodes, 1983; Ryder, 1965). For example, employees with children of the same age tend to have similar events occurring in their family lives, which produces a shared language, including a common vocabulary and interpretation of those events (Runkel, 1956; Triandis, 1960).

The work-related and non-work-related communication patterns produced by these similarities are likely to persist because of the tendency for communication patterns to stabilize in organizations (Katz, 1980; March & Simon, 1958; Roberts & O'Reilly, 1978; Weick, 1979). As two individuals communicate over time, they develop a form of language compatibility that is unique to them. Two employees may, for instance, share a common organizational experience that facilitates initial conversations. As they continue to converse, they quickly develop additional similarities in attitudes, language, trust, and experience that facilitate subsequent communication (Kiesler & Kiesler, 1969; Williamson, 1985). In addition to these acquired similarities, continued communication among employees results in comfortable work patterns (Katz, 1982) and consequent feelings of security for those involved (Weick, 1979). Hence, initial conversations triggered by a single shared experience or other common background produce over time a form of

shared social investment that employees are reluctant to forfeit. As such social investments mount, communication patterns become increasingly stable.

Demographic attributes such as age, tenure, occupation, and gender provide surrogate measures for the common experiences and background that shape language development. For instance, employees with different occupations often share few job-related experiences and thus develop very different occupational languages (Triandis, 1959). Similarly, employees of different genders often have very different social, educational, and work experiences. These differences in background and experience may result in language differences that constrain communication among employees of different occupations or genders. Thus, because demographic attributes produce shared experiences and shared experiences create language compatibilities, people who share demographic attributes are believed to communicate more frequently than those who do not (March & Simon, 1958: 167; Pfeffer, 1983). Consequently, the degree to which an employee is demographically similar to others in an organization may be an important determinant of how frequently that employee communicates within the organization. In this study, we focused on the two most frequently examined demographic variables in organizations, age and tenure, both of which seemed likely to be important determinants of language.

Age. Employees of similar age, regardless of their expertise, status, or tenure in an organization, tend to have common non-work-related experiences. Ryder suggested that a group of individuals of similar age takes on "a distinctive composition and character reflecting the circumstances of its unique origin and history" (1965: 845). For instance, employees who were college students during the Vietnam War share memories of their experiences during those social upheavals. And employees who grew up during the Great Depression share memories of the effects of that economic disaster that distinguish them from younger employees. In addition to such historically generated similarities, employees of similar age tend to share common non-work-related experiences because they tend to be at similar points in their family lives (Lawrence, 1980). The youngest employees tend to be unmarried, and slightly older employees tend to be newly married with young children. Middle-aged employees may be divorced and have parents who need special care, and older employees tend to look forward to quiet lives without dependents and with grandchildren.

These common experiences outside the workplace appear to produce shared attitudes, interests, and beliefs among employees of similar age inside the workplace (Rhodes, 1983). For instance, studies have shown a positive association between age and job satisfaction (Hunt & Saul, 1975; Kalleberg & Loscocco, 1983). People tend to become more satisfied with work as they grow older, regardless of their tenure, gender, occupational level, income, and education. Research has also reported positive associations between age and job involvement (Saal, 1978) and between age and commitment (Morris & Sherman, 1981), and a negative association has been re-

ported between age and intention to quit (Mobley, Horner, & Hollingsworth, 1978). Because common attitudes, interests, and beliefs both produce a common language (Runkel, 1956; Triandis, 1960) and encourage communication (Byrne, 1969; Lazarsfeld & Merton, 1954; Rogers & Bhowmik, 1971), age similarity seems likely to enhance communication between two employees.

Although age similarity may produce similarity in general attitudes about work that facilitate communication, such attitudinal similarity is unlikely to have much direct bearing on conversations about technical work. Technical conversations are facilitated by a common technical language that is in most cases not directly related to similarity in age.¹ Thus, age similarity is more likely to facilitate nontechnical discussions at work. Nevertheless, the self-reinforcing nature of communication links (Homans, 1950; March & Simon, 1958) implies that the communication channels produced by non-work-related conversations will influence the ease of work-related communications. Employees may, for instance, initially converse about common interests outside the workplace. However, once they have established a communication channel, they may also use it for technical communication. Thus, although age similarity has its most direct effect on informal, non-work-related communication (Lincoln & Miller, 1979), it also has an indirect effect on more formal technical communication. Therefore,

Hypothesis 1: Employees who are relatively similar to each other in terms of age will communicate more frequently about technical issues than employees who are relatively dissimilar.

Tenure. The employees of most organizations develop a unique common language that facilitates communication about work-related issues (Allen & Cohen, 1969; Guetzkow, 1965; March & Simon, 1958; Williamson, 1975, 1985). In research and development settings, this language facilitates communication about technical issues. As tenure in an organization increases, employees attain a better understanding of policies and procedures and a better understanding of the way technical work is accomplished. Thus, because tenure functions as an indicator of organizational experience, it also functions as an indicator of familiarity with the organizational language (March & Simon, 1958). Further, employees will find communication most efficient with other employees whose organizational language skills are at least as extensive as their own, and hence employees will seek communication with others whose tenure in an organization is at least as great as their own. But, since all employees are likely to seek communication with others whose tenure is at least as great as their own, only communication among

¹ An important exception is age functioning as a surrogate measure for familiarity with the technology used on a job. For instance, young engineers may receive common external training in state-of-the-art technologies while in college or graduate school. Such training may be difficult to obtain on the job. Hence, in some settings age, much like tenure, may serve as a surrogate measure for technical language development. However, this is likely to occur only in work settings involving technologies more advanced than that examined in this study.

employees of similar tenure is likely to be reciprocated. In addition, individuals of similar tenure may develop unique interpretations and understandings that stem from shared experiences on projects or commonly experienced organizational events. Such idiosyncratic language may cause individuals of similar tenure to be out of touch with their senior or junior colleagues and thereby encourage employees to communicate only with others in their tenure group.

The tendency for communication patterns to stabilize may further concentrate communication around those similar in tenure. Assume for the moment that existing communication patterns in an organization are randomly determined and are thus independent of tenure, and that through social investments they have stabilized over time. A group of individuals entering such a setting with a strong desire to establish communication links has two options. The first is to establish ties with employees who already have deeply entrenched communication networks (Wagner et al., 1984). The second is to establish ties among themselves. Penetrating established communication networks is difficult for new employees. Such activity disrupts current networks (Roberts & O'Reilly, 1979) and hence threatens to destroy the value of social investments inherent in these networks for longer-tenured employees. On the other hand, because all new entrants share a need to develop communication links, new entrants will find it relatively easy to communicate with other new entrants. Therefore, because of similarity in organizational language and the presence of social investments,

Hypothesis 2: Employees who are relatively similar to each other in terms of their organizational tenure will communicate more frequently about technical issues than employees who are relatively dissimilar.

Technical Communication and Demography: Inside and Outside Project Groups

In the preceding discussion, we argued that an organization's age and tenure distributions exert a systematic effect on technical communication: as demographic similarity increases, technical communication should increase. However, technical communication differs inside and outside project groups. Communication inside project groups generally involves communication among employees who work near one another, collaborate daily on project tasks, and are supervised by the same individual. In contrast, communication outside a project group yet within an organization generally involves communication among employees who do not collaborate daily on project tasks, work at a distance from one another, and are supervised by different individuals. In this section, we propose that although age and tenure similarity both contribute to the frequency of technical communication, their contribution differs inside and outside project groups.

Two assumptions guided our hypotheses about the effects of age and tenure similarity on technical communication. First, because tenure similarity directly facilitates work-related technical communication and age sim-

ilarity primarily affects technical communication indirectly through non-work-related communication, we assumed that tenure similarity exerts a stronger influence on technical communication than age similarity.

Second, we assumed that the effect of tenure similarity on the frequency of technical communication diminishes over time. Because individuals enter organizations relatively uninformed, they have strong incentives to develop the language skills that facilitate effective communication. As a result, employees make their most rapid gains in organizational language skills during an initial socialization period. However, after employees learn basic language skills, further gains in language development make increasingly less dramatic differences in their ability to communicate effectively. Thus, language differences associated with differences in tenure are likely to diminish over time. For example, when two employees have been in an organization one and four years respectively, the difference of three years of organizational experience between them may substantially impede communication. However, ten years later, substantial language differences between these employees may not exist, and therefore the three years difference in organizational experience may have no effect on their ease of communication. However, because social investments that stabilize communication patterns are unlikely to diminish over time, the relationship between tenure similarity and frequency of technical communication may not disappear.

Using these two assumptions, we derived hypotheses concerning the relative effects of age and tenure similarity on the frequency of technical communication among employees inside and outside project groups.

Inside project groups. The impact of tenure similarity on technical communication is likely to diminish rapidly within project groups. The typical engineering project involves considerable interdependence of project members. This interdependence creates strong incentives for current members to help new members quickly overcome language and skill deficiencies that would impede the group's performance. In addition, the relatively small number of employees inside project groups produces a high density of communication (Collins & Guetzkow, 1964), thereby further facilitating the speed with which new members develop work-specific language skills. As a result, new members are assimilated rapidly inside project groups, and their levels of technical communication inside project groups do not differ from the communication levels of their senior colleagues (Lee & Allen, 1982). Hence, location inside project groups minimizes the effect of tenure similarity on technical communication. In contrast, the effects of age similarity on technical communication, discussed earlier, seem unlikely to change over time. This assumption seems reasonable because age similarity affects technical communication only indirectly, primarily through non-work-related communication. Thus,

Hypothesis 3: The age similarity of project group members has a greater impact than their tenure similarity on the frequency of technical communication inside project groups.

Outside project groups. Although the impact of tenure similarity on technical communication outside project groups should also diminish over time, it is unlikely to diminish as quickly as it will inside a work group. Employees in different project groups tend to be much less interdependent than employees within the same group. Consequently, it seems likely that long-tenured employees have fewer incentives to teach new employees in other project groups the language skills required to communicate effectively outside their project groups. Moreover, the relatively low density of communication outside project groups means that the requisite language and skills for communicating outside a group are likely to develop rather slowly. Thus, the association between tenure and outside-the-work-group language skills is likely to persist longer than the association between tenure and inside-the-work-group language skills. Therefore, given that in general, tenure similarity has a greater effect on technical communication than age similarity,

Hypothesis 4: The tenure similarity of employees who are not members of the same project group should have a greater impact than their age similarity on the frequency of technical communication outside project groups.

METHODS

Data

Data for this study were obtained from the population of engineers and engineering managers in a research division of a medium-sized U.S. electronics firm. The division is geographically isolated from the rest of the firm and primarily conducts development work, as opposed to basic research or technical service projects (cf. Katz & Tushman, 1979). The division's work can be characterized as moderately rather than highly technological. The division, which we hereafter call the organization, has 19 project groups ranging in size from three to nine members. All project groups are located on the same floor in one building. Each engineer has an office or working area surrounded by a five-foot partition. Most project groups meet informally weekly. The average age of engineers and engineering managers is 39 (s.d. = 9.8, range = 26–65), and their average tenure is 5.7 years (s.d. = 5.3, range = 0–24). The organization has a dual-track engineering–management career that includes six levels. Questionnaires were distributed to the organization's 92 engineers and engineering managers. Nearly all questionnaires were returned ($N = 88$), yielding a 96 percent response rate. In addition, we obtained demographic data on the 92 employees from the company's personnel records.

Control Variables

Several control variables were important for this study. First, we controlled for any direct effect of organizational tenure on technical communication. As an employee's organizational tenure increases, interpersonal relationships develop, and opportunities to speak with others may increase;

therefore, technical communication should increase. Thus, tenure may influence technical communication independent of an employee's similarity in tenure to others in the organization. Second, we controlled for the effect of career level on technical communication. As employees advance to higher career levels, the task characteristics of their jobs may require more frequent communication. Further, an employee's career level influences technical communication through the impact of formal hierarchy on status and interaction channels (Homans, 1974; Lincoln & Miller, 1979). Finally, we controlled for the effect of project-group size on technical communication inside project groups. As the size of a project group increases, with other effects held constant, the average amount of technical communication for each group member should decline (Thomas & Fink, 1963).

We did not control for age, gender, education, or the effect of project-group size on technical communication outside project groups. The literature suggests that age influences communication because the more similar people are in age, the more likely they are to hold similar attitudes, interests, and beliefs, and thus the more likely they are to communicate with one another (Riley, Johnson, & Foner, 1972; Ryder, 1965). However, the explanation for this relationship is not chronological age *per se* but age similarity, a variable measured directly in this study. The only reason for specifying age as a control variable would be if people in work organizations were known to communicate more frequently at one age than another. Thus, if 35-year-olds talked with others more frequently than 45-year-olds, or if people talked with 35-year-olds more than with 45-year-olds, age would be an important control variable. However, to our knowledge, no theoretical statements or empirical results exist that suggest such a relationship. Hence, we did not include age as a control variable.² The proportion of women in an organization is also believed to influence communication frequency (cf. Kanter, 1977; Spangler, Gordon, & Pipkin, 1978). However, there were only four women (4.3%) in the organization studied, a number so small that gender seemed unlikely to have a major effect on the results.

Allen (1967) showed that educational similarity influences communication frequency. For instance, engineers with advanced degrees tend to talk more frequently with others who hold advanced degrees than with those holding only bachelor's degrees. However, a comparison of the technical

² Many studies routinely include age as a control variable because it frequently predicts behavioral variation. However, until recently, scholars have paid little attention to why that is so, and thus have included age more out of habit than for theoretical reasons (Ferris, 1988). Recent work (Lawrence, 1987, 1988) has suggested that age produces the results that have been observed only because it acts as a surrogate for other processes. This study attempted to be more judicious by employing an independent variable, age similarity, that more closely measures the theoretical constructs studied here.

However, we computed the regression equations presented in the Results section including both age and age similarity as predictors of communication frequency. Although including age slightly reduced the significance of other coefficients, none of the age coefficients were significant, and the results were consistent with those reported. Therefore, for both theoretical and empirical reasons, we omitted age from the analysis.

communication of two educational groups in the organization studied here showed no significant differences in communication frequency by educational level. Engineers of educational levels up to and including having a bachelor's degree did not differ significantly in the average frequency with which they communicated with (1) other engineers having a similar education and (2) other engineers with graduate education ($t = .89$, $df = 78$). In addition, engineers with graduate education did not differ significantly in the average frequency of their communication across the two groups ($t = .88$, $df = 70$). Finally, project-group size may influence technical communication outside a group if the variation in project-group size is large relative to the organization's size. That is, as project-group size increases, the number of people outside the project group decreases, and thus the number of external people with whom a project-group member may communicate decreases. However, the correlation between project-group size and technical communication outside the project groups was not significant ($r = .12$, *n.s.*). Thus, we did not include project-group size as a control variable in the analysis of communication outside project groups.

Measures

Frequency of technical communication. Two measures of the frequency of technical communication, technical communication inside project groups and technical communication outside project groups, were obtained from employees' responses to the relational question: How often do you discuss technical issues you face in your work with each person on this list? We gave employees a list of all research and development engineers and engineering managers in the organization. Then, using a 5-point Likert-type scale ranging from "never" to "roughly every day," employees indicated the frequency with which they discussed technical issues with each person on the list. People may overreport or underreport the frequency of their communications with others; thus, we computed both the measure of inside-project-group communication and the measure of outside-project-group communication using the average frequency with which others indicated speaking with an employee. Measured in this manner, differences in question interpretation and response patterns across employees had a similar effect on the technical communication values for each employee.³ Descriptions of the two measures follow.

³ The four individuals who did not return questionnaires are included in the analysis. To complete the relational responses for responding employees who work in project groups with nonrespondents, we substituted self-reported communication with the nonresponding individuals. A *t*-test of communication frequency values showed no difference between employees whose values include self-reports and those whose values do not ($t = .02$, $df = 16$, $p = .98$). The same procedure was used to compute the outside-project-group communication measures.

Eleven employees who returned questionnaires were not on the original list of employees. Although the questionnaire provided space for adding extra names, respondents did not have an equal opportunity to be reminded of their contacts with those 11 employees. Consequently, for those individuals, we used self-indications of the frequency of their communication with other employees in calculating the communication measures.

Technical communication inside a project group was defined as the average frequency with which project-group members indicated communicating with an employee ($\bar{x} = 2.75$, range = .9–4.0). Thus, if Mary is in a project group of four employees, Mary's technical communication inside her group is measured by taking the relational responses of the other three employees in her group and computing the average frequency with which those employees indicate they communicate with Mary.⁴ Ten employees who participated in two project groups were included twice in the inside-project-group analysis, once for each project group.

Technical communication outside a project group was defined as the average frequency with which non-project-group members indicated communicating with an employee ($\bar{x} = .39$, range = .05–1.0). Thus, if Bob is in a project group of four employees, Bob's technical communication outside his group is measured by taking the relational responses of the 88 employees who do not belong to it and computing the average frequency with which those employees indicate they communicate with Bob.

Age and tenure similarity. The measures of demographic similarity were those used by Wagner and colleagues (1984), except that we changed the sign of each measure for ease of interpretation. Thus, an employee's similarity to other employees in his or her comparison group increases rather than decreases with the value of these measures. The objective in defining demographic similarity measures is to represent the extent to which an employee is a member of a group of individuals close in age or close in tenure. The more similar an employee is to the employees closest to him or her in age or tenure, the more likely the individual is to belong to a group with whom communication is relatively easy. For this reason, it is important to select a similarity measure that captures an employee's demographic position within some subgroup of an organization rather than demographic position within an entire organization.

A subgroup of ten employees, a number that we arbitrarily selected as being neither too small nor too large, was used to calculate the within-the-organization similarity measures.⁵ The resulting age- and tenure-similarity measures thus represent an employee's similarity in age or tenure to the ten individuals in the organization closest in age or closest in tenure to that employee. Because project groups in this study already represented

⁴ There are several ways of controlling for the effects of group size on the frequency of communication inside project groups. The measure used in this study captures average communication frequency per person. We controlled for the relationship between communication frequency and project-group size directly by including project size in regression analyses. An alternate approach is to control for this relationship in a dependent measure. Katz and Tushman (1979), for instance, divided the total amount of project communication for each individual by the logarithm of the possible interactions ($\log_2[n(n-1)]$), as suggested by MacKenzie (1966). Using this weighting of inside-project-group communication frequency does not change the results of this study.

⁵ Regression results using several subsets larger than ten were examined. The larger subsets all weakened the regression results, although not substantially (cf. Wagner et al., 1984).

reasonably small organizational subgroups of fewer than nine members, we used entire project groups to calculate each within-project-group similarity measure.

Age and tenure similarity within the organization were defined as

$$D_i^O \equiv -\min_{S_n \subset O} \left[\frac{1}{n-1} \sum_{j \neq i \in S} (x_i - x_j)^2 \right]^{1/2},$$

where D_i^O is the age or tenure similarity for employee i within organization O , S_n is any subset of n employees in O , and x is an employee's age or tenure.

Age and tenure similarity within project groups were defined as

$$D_i^G \equiv -\left[\frac{1}{n-1} \sum_{j \neq i \in G} (x_i - x_j)^2 \right]^{1/2},$$

where D_i^G is the age or tenure similarity for employee i within project group G , n is the number of employees in G , and x is an employee's age or tenure.

Career level was defined as an employee's position on the organization's six-level engineering-management hierarchy. Project-group size was defined as the number of employees within each project group.

Tables 1 and 2 provide the means, standard deviations, and correlations of the measures used for the inside-project-group and outside-project-group analyses.

RESULTS

Inside-Project-Group Analysis

Table 3 presents the analysis examining communication inside the project groups. The first model in Table 3, which includes only the control

TABLE 1
Inside-Project-Group Analysis:
Means, Standard Deviations, and Correlations^a

Measures	Means	s.d.	Correlations				
			1	2	3	4	5
1. Technical communication	2.75	0.86					
2. Project-group age similarity	-11.81	5.06	.43***				
3. Project-group tenure similarity	-6.88	4.36	.30**	.50***			
4. Career level	3.21	1.30	.17	.02	.00		
5. Organizational tenure	6.06	5.73	-.25*	-.50***	-.68***	.11	
6. Project-group size	5.63	1.97	-.61***	-.34***	-.36***	-.15	.19

^a $N = 102$.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 2
Outside-Project-Group Analysis:
Means, Standard Deviations, and Correlations^a

Measures	Means	s.d.	Correlations			
			1	2	3	4
1. Technical communication	0.39	0.19				
2. Organizational age similarity	-1.40	1.33	.04			
3. Organizational tenure similarity	-0.76	1.33	-.19	.42***		
4. Career level	3.14	1.31	.51***	-.14	-.13	
5. Organizational tenure	5.67	5.34	.33**	-.43***	-.91***	.16

^a $N = 92$.

* $p < .05$

** $p < .01$

*** $p < .001$

variables, shows that, as expected, the size of a project group has a significant impact on technical communication inside the group. As project-group size increases, the frequency of communication decreases. However, neither of the other control variables, career level or organizational tenure, makes a significant contribution to the explained variation in technical communication. Model 4, including both the control and independent variables, supports Hypothesis 1, which states that employees who are relatively similar to one another in terms of age will communicate more frequently about technical issues than employees who are relatively dissimilar. The coefficient for within-project-group age similarity is significant and in the expected direction, suggesting that the smaller the age differences between an employee and the other employees in his or her project group, the more frequently he or she will communicate with them concerning technical issues. The analysis shown for model 4 does not support Hypothesis 2, which states that increasing tenure similarity encourages technical communication. The coefficient for project-group tenure similarity is not significant, suggesting that the variable's effect diminishes rapidly inside project groups, as argued in Hypothesis 3, and, in fact, disappears completely. Indeed, the results for model 4 support Hypothesis 3, which states that project-group age similarity has greater impact on technical communication inside project groups than project-group tenure similarity. Not only is the coefficient for project-group age similarity significant, while that for project-group tenure similarity is not, but a comparison of the standardized regression coefficients suggests that the effect of project-group age similarity on technical communication is several times greater than the effect of project-group tenure similarity.

To confirm that the high correlation between within-project-group age and tenure similarity ($r = .50$, $p < .001$) did not produce these results, we computed separate analyses for these variables, shown under models 2 and 3. The relative stability of the standard errors in each model provides additional confidence in the results for model 4. Even when assessed indepen-

TABLE 3
Determinants of the Frequency of Technical Communication
Inside Project Groups^a

Measures	Models ^b			
	1 Control Variables	2 Age Similarity	3 Tenure Similarity	4 Full Model
Career level	.071 <i>.054</i> <i>.108</i>	.065 <i>.053</i> <i>.100</i>	.071 <i>.055</i> <i>.109</i>	.067 <i>.053</i> <i>.102</i>
Organizational tenure	-.023 <i>.012</i> <i>-.160</i>	-.009 <i>.014</i> <i>-.060</i>	-.024 <i>.016</i> <i>-.165</i>	-.013 <i>.017</i> <i>-.090</i>
Project-group size	-.245*** <i>.036</i> <i>-.567</i>	-.222*** <i>.037</i> <i>-.514</i>	-.246*** <i>.038</i> <i>-.568</i>	-.226*** <i>.038</i> <i>-.524</i>
Project-group age similarity		.036* <i>.016</i> <i>.214</i>		.038* <i>.017</i> <i>.221</i>
Project-group tenure similarity			-.001 <i>.023</i> <i>-.007</i>	-.010 <i>.023</i> <i>-.052</i>
Constant	4.06	4.29	4.06	4.28
R ²	.41	.44	.41	.44
Adjusted R ²	.39	.41	.38	.41
F	20.65***	17.39***	15.32***	13.83***

^a N = 102.

^b The values shown in each block are the unstandardized regression coefficient, the standard error (in italics), and the standardized regression coefficient.

* $p < .05$

** $p < .01$

*** $p < .001$

dently, project-group age similarity maintains its significant relationship with technical communication, whereas project-group tenure similarity does not.

Outside-Project-Group Analysis

Table 4 presents the analysis examining communication outside the project groups. The first model in Table 4, including only the control variables, shows that career level and organizational tenure have a significant impact on technical communication outside project groups. As career level and organizational tenure increase, communication frequency increases. The results presented for model 4, which includes the control and independent variables, support Hypotheses 1, 2, and 4. Consistent with Hypothesis 1, the results suggest that employees who are relatively similar to others in terms of their age will communicate more frequently outside project groups about technical issues than employees who are relatively dissimilar. The positive coefficient for organizational age similarity indicates that for any

TABLE 4
Determinants of the Frequency of Technical Communication
Outside Project Groups^a

Measures	Models ^b			
	1 Control Variables	2 Age Similarity	3 Tenure Similarity	4 Full Model
Career level	.087*** .013 .468	.089*** .012 .487	.086*** .012 .461	.068*** .011 .480
Organizational tenure	.009** .003 .263	.013*** .003 .380	.030*** .007 .867	.033*** .007 .942
Organizational age similarity		.039** .013 .279		.036** .012 .258
Organizational tenure similarity			.094*** .027 .866	.088** .026 .628
Constant	.13	.15	.08	.11
R ²	.33	.39	.41	.46
Adjusted R ²	.31	.37	.39	.43
F	21.33***	18.49***	19.83***	18.31***

^a N = 92.

^b The values shown in each block are the unstandardized regression coefficient, the standard error (in italics), and the standardized regression coefficient.

* p < .05

** p < .01

*** p < .001

employee and the ten people most similar to him or her in age, the smaller the age differences between the focal employee and the others, the more frequently the employee communicates with employees outside his or her project group. Consistent with Hypothesis 2, the results suggest that employees who are relatively similar to each other in terms of their organizational tenure will communicate more frequently about technical issues than employees who are relatively dissimilar. The positive coefficient for organizational tenure similarity indicates that for any employee and the ten people hired the closest in time to that employee, the smaller the time gaps in hiring, the more frequently the employee communicates with others outside his or her project group. Thus, both organizational age similarity and organizational tenure similarity contribute to the explained variation in technical communication outside project groups.

Finally, the results presented for model 4 are consistent with Hypothesis 4, which states that organizational tenure similarity has a greater impact on technical communication outside of project groups than organizational age similarity. A comparison of the standardized regression coefficients suggests that the effect of organizational tenure similarity on technical communication is more than twice that of organizational age similarity.

The high correlations among organizational age similarity, organizational tenure similarity, and organizational tenure raise potential multicollinearity problems with the outside-project-group analysis. As with the inside-project-group analysis, models 2 and 3 show separate analyses for the organizational age and tenure similarity measures. The relative stability of the standard errors of these variables and the results of several additional analyses⁶ provide further confidence in the results of model 4.

DISCUSSION

The results of this study show a relationship between organizational demography and communication frequency. Two measures of organizational demography, age similarity and tenure similarity, appeared to influence the frequency of technical communication in the research division of an electronics firm. However, these similarity measures do not contribute equally to explaining the variation in technical communication inside and outside project groups. As predicted, inside project groups, the age similarity of group members exerts more influence on technical communication than their tenure similarity. The opposite relationship seems to hold outside project groups, where the similarity of organizational members' tenure exerts more influence on technical communication than their similarity in age.

One explanation for these results may be that the effects of tenure similarity on communication frequency are more sensitive to situational characteristics than are the effects of age similarity. Tenure similarity is a significant predictor of technical communication in situations where shared work-related knowledge and skills do not develop rapidly and where employees have little incentive to assimilate new members. In organizations or large groups in which members have infrequent contact, the development of such knowledge and skills occurs relatively slowly. However, in small

⁶Several additional analyses were performed to assess the potential impact of multicollinearity on the results. The high correlations among organizational age similarity, organizational tenure similarity, and organizational tenure result primarily from a skewed organizational tenure distribution. Eighty-one employees had been with the organization for less than 9 years, and the remaining 11 employees had been with the organization 15 years or more (range = 15–24). As a result, the 11 employees had high values for organizational tenure and organizational tenure similarity. Deletion of those employees from the group as a whole reduced the correlations as follows: organizational age similarity and organizational tenure from $r = .43$ ($p < .001$) to $r = .17$ (n.s.); organizational tenure similarity and organizational tenure from $r = .91$ ($p < .001$) to $r = .27$ ($p < .05$); organizational age similarity and organizational tenure similarity from $r = .42$ ($p < .001$) to $r = .08$ (n.s.).

Additional analyses included regression analysis with the 11 high-tenured individuals deleted, regression analysis using the logarithm of the skewed independent measures, and analysis of covariance controlling and testing for differences between employees with organizational tenure of less than 9 years and employees with organizational tenure greater than or equal to 15 years. The results of these analyses suggest that the relationships presented in Table 4 are not an artifact of multicollinearity.

groups, shared work-related knowledge and skills develop rapidly, and current members are more likely to disrupt current communication patterns to assimilate new entrants. As a consequence, in such settings tenure differences exert less influence on technical communication. These situational characteristics appear not to influence the impact of age similarity on the frequency of technical communication. Thus, the results are consistent with the interpretation that the effects of age similarity on technical communication result primarily from basic social behaviors that occur independently of task characteristics.

The results from this study make several contributions. First, the empirical link between organizational demography and communication frequency supports one of the basic assumptions used in organizational demography research. Previous studies (Wagner et al., 1984; McCain, O'Reilly, & Pfeffer, 1983) have argued that demographic similarity produces important organizational outcomes, in part by altering levels of communication. However, those studies did not test the relationship between demography and communication. The results presented here provide empirical evidence that supports the theoretical validity of this basic assumption and hence encourages continuing work on the relationship between organizational demography and organizational outcomes. Second, although past work on organizational demography has tended to treat all demographic variables as having similar effects on organizational outcomes, this study suggests that such effects depend on the context in which each demographic variable is examined. Thus, future theory and research on demographic variables should pursue both their similar and distinct properties as predictors of organizational outcomes.

Finally, this study contributes to explanations of communication frequency. For several decades, research in social psychology has consistently found that dyads of similar individuals communicate more frequently and effectively than dyads of dissimilar individuals (Rogers & Bhowmik, 1971). Organizational demography builds on this relationship between similarity and communication by moving beyond the level of dyadic analysis. The demographic approach used in this study allows researchers to examine an individual's similarity relative to an entire group or subgroup of individuals. Hence, this approach permits predictions concerning communication frequency at the individual, group, and organizational levels.

The results from this study are limited in several ways. One limitation is that they are based on a single organization; thus, caution must be exercised in generalizing to other organizations. In addition, the project groups in this organization focus almost exclusively on development work. Since project type influences communication patterns (Katz & Tushman, 1979), it is possible that the strength of the relationship between age and tenure similarity and technical communication differs in organizations with a different mix of technical service, development, and basic research projects. Another potential limitation is that sociometric measures do not always produce accurate measures of actual communication patterns (Bernard &

Kilworth, 1977).⁷ However, this criticism applies to all past research on technical communication, and past research has measured something about the way engineers perceive their communications that is related consistently with performance. Nonetheless, the correct interpretation of this relationship may not be that engineers' actual technical communication is associated with performance, but rather that engineers' perceptions of technical communication are associated with performance. Hence, a possible alternative interpretation of the results from our study is that age and tenure similarity influence engineers' perceptions of technical communication.

This alternate interpretation suggests that the meaning of the relationship between project-group size and technical communication inside project groups should be examined in more detail. If relational measures indicate engineers' perceptions of technical communication, factors that produce perceptual biases are likely to influence those perceptions. For instance, the availability heuristic (Tversky & Kahneman, 1974) suggests that employees are more likely to remember contacts with employees seen frequently than contacts with employees seen occasionally. Thus, the negative association between project-group size and technical communication may result because an individual's project group includes the employees the individual sees most frequently. The individual is most likely to remember communications with these employees, and therefore the frequency of remembered communications increases directly with the decreasing size of the individual's project group.

Another topic for additional research is the effect of organizational demography on communication-related outcomes. For instance, one important area of inquiry is the relationship between organizational demography and R&D project-group performance. Given the positive relationship previous research has found between technical communication and project-group performance (Allen, 1970; Ebadi & Utterback, 1984; Pelz & Andrews, 1976) and the positive relationship found in this study between demographic similarity and technical communication, we would expect projects whose members are demographically similar to show relatively high rates of communication and thus relatively high performance. However, an important caveat to this hypothesis is that, as discussed earlier, project-group type appears to determine the kind of communications necessary for high-performance groups. Moreover, in some cases, an overly homogeneous project group, by encouraging internal communication and discouraging external communi-

⁷Although Bernard and Kilworth (1977) raised an important criticism, studies of the discrepancy between real and perceived communication frequency require more study. For instance, one of the several studies conducted by Bernard and Kilworth involved a group of deaf individuals and a comparison of their memories of teletype communications with their actual teletype communications. This seems a reasonable test of the inaccuracy hypothesis; however, we also know that the medium people use in communicating influences the frequency and content of their interaction (Daft & Lengel, 1984). Thus, Bernard and Kilworth may have picked up differences in media use rather than differences in accuracy.

cation, might experience lower performance over time (Katz, 1982). Finally, at some point, increasing communication no longer increases performance but becomes excessive and counterproductive. Thus, an overly homogeneous group may experience lower performance than a more demographically diverse group.

Future research should also examine the distinctions between various definitions of demography and the effect those definitions may have on organizational outcomes. For instance, although Katz's (1982) work and ours both used demographic measures of tenure, the conceptual meaning of those measures differs. Katz examined group tenure, defined as the average time project-group members have worked together. The key dimension of group tenure is length of time. Although the relationship is not linear, the members of project groups of long tenure tend to communicate less frequently than the members of short-tenured project groups. In contrast, we examined similarity of organizational tenure which represents the differences in organizational tenure among project-group members. The key dimension of this measure is similarity. In project groups whose members are dissimilar in organizational tenure, communication tends to be less frequent than it is in project groups whose members are similar in organizational tenure.

The differences between the two demographic measures represent important conceptual differences. For instance, a project group's characterization along the time dimension does not necessarily predict the group's characterization along the similarity dimension. Members of a project group with short group tenure may be either very similar or very dissimilar in their organizational tenure. In addition, the potential range of these similarity differences must decrease as group tenure increases. Long group tenure requires that, on the average, the organizational tenure of group members will increase, which concatenates the possible range of tenure similarity. Thus, group tenure and organizational tenure similarity do not measure the same demographic concept.

Yet even if we use a measure of tenure similarity based on group rather than organizational tenure, group tenure and group tenure similarity still differ. For instance, when group tenure is either quite short or quite long, the group tenure similarity of project-group members will tend to be relatively high. When group tenure falls between short and long, the group tenure similarity of project-group members will tend to decrease. Regardless of whether an organizational or group tenure-similarity measure is used, group tenure examines mean effects, whereas tenure similarity examines distributional effects. These distinctions emphasize the importance of carefully defining demographic measures and considering the effects of their differences.

The relationship found in this study between organizational demography and technical communication suggests that demographic attributes may provide project and human resource managers with a useful tool for facilitating high performance in research and development organizations. On the project level, the results from this study suggest that ensuring diversity in

organizational tenure may be an effective approach for designing project groups. Given the relative importance of external communication for project-group performance and the relative unimportance of tenure similarity in producing communication inside project groups, such a design has a number of advantages. Tenure diversity provides a project group with a set of diverse contacts outside the group. In addition, the communication channels established between longer- and shorter-tenured employees inside project groups will probably spill over to contacts outside project groups. For instance, if Mary, a new employee, works on a project with Bob, a 20-year veteran, Mary will probably find it easier to contact Bob's friends outside the project group as a result of her association with Bob. Research shows that keeping such external communication channels open facilitates project performance (Katz, 1982). Tenure diversity also provides good training for new employees. Inside project groups, longer-tenured employees have strong incentives for getting new employees up-to-speed. Thus, organizations benefit because important work-specific knowledge and skills are passed on from one generation of employees to another.

Suggesting normative implications concerning age demography inside project groups is considerably more problematic. Although age homogeneity inside a project group may enhance technical communication, such similarity may simultaneously reduce the diversity of contacts outside the group and thereby negatively affect project performance. In addition, age homogeneity within project groups may produce age norms that influence project-group assignments (Lawrence, 1988). For instance, managers might assign only older engineers to challenging basic research projects because that age group has always staffed those projects. Although such an assignment policy produces age-homogeneous project groups whose members are likely to communicate frequently, it also creates project groups defined by age statuses: only one age group gets assigned to the challenging, state-of-the-art projects engineers prefer. The frustration this differentiation is likely to produce among excluded engineers may encourage some to leave for more promising jobs and others to decrease their efforts on the job (Lawrence, 1987). Thus, in human resource planning, a balance between homogeneity and diversity in age and tenure probably carries the most significant benefits for both employees and organizations.

On the organizational level, the results of this study suggest that demographic homogeneity enhances technical communication and thus may improve organizational performance. However, since year-to-year hiring and turnover patterns determine an organization's demographic distribution, altering demographic homogeneity, particularly in the short run, is problematic. In addition, it is not entirely clear what demographic distribution is optimal. Hiring large blocks of employees of the same age every few years may encourage communication within these large cohorts but at the same time create strong divisions between cohorts and severely isolate those not hired in peak years. A seniority-based layoff that removes entire cohorts of entrants may have an isolating effect similar to that of fluctuations in hiring.

On the other hand, steady year-to-year hiring may avoid the emergence of demographically based divisions and limit the number of isolated individuals but may also restrict the frequency of communication promoted by large cohorts. Clearly, there is a need for additional research on the differing effects of alternative demographic patterns on communication. Nonetheless, managers should pay attention to the long-term communication-related effects of staffing decisions. This study suggests that staffing decisions made today may influence the communication patterns of organizations 5, 10, perhaps 20 or more years into the future.

In summary, this research provides results encouraging further study of demographic variables in organizations. Certainly we need to learn more about how and under what circumstances different demographic variables produce organizational outcomes. Further, we need to learn more about the processes that intervene between demographic characteristics and organizational outcomes. This study suggests that organizational demography produces at least one organizational outcome, performance, through the relationship between demography and technical communication. However, other intervening variables, such as intercohort conflict, status differences, and social comparison processes, may also be important. The many explanatory possibilities of such intervening variables, in conjunction with the utility of demographic variables as managerial tools, make organizational demography a topic of continuing interest.

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Todd R. Zenger is a doctoral candidate in organization and strategic studies at the Anderson Graduate School of Management, University of California, Los Angeles. He is currently a visiting assistant professor at Pepperdine University. His research interests include organizational economics, employment, contracting in large and small firms, organizational innovation, and R&D management.

Barbara S. Lawrence earned her Ph.D. degree at the Massachusetts Institute of Technology. She is an assistant professor in the Anderson Graduate School of Management at the University of California, Los Angeles. Her current research interests include age effects in organizations, the science of social science, career theory, and human resource management with an emphasis on science and engineering.

THE STRENGTH OF STRONG TIES: SOCIAL NETWORKS AND INTERGROUP CONFLICT IN ORGANIZATIONS

REED E. NELSON
Louisiana Tech University

The relationship between social networks and conflict in 20 organizational units was investigated. Results indicated that low-conflict organizations are characterized by higher numbers of intergroup strong ties, measured as frequent contacts, than are high-conflict organizations. Further, comparison of the network configuration of the organizations studied suggested that high- and low-conflict organizations feature significantly different sociometric structures.

As a ubiquitous feature of social systems, intergroup conflict has been studied from a variety of perspectives with a wide array of methodologies. Exchange theory, game theory, Marxist and functionalist perspectives, and psychiatric and psychological approaches are all represented in the extant research. The different methodological approaches taken include laboratory experiments, survey research, and case and ethnological studies. Despite the considerable variety of approaches available, most studies are concentrated in a few traditional areas, although a number of promising new avenues await investigation. The present study followed one of those avenues by examining the relationship between social networks and conflict in organizations across 20 organizations.

The bulk of empirical research on conflict in organizations has been micro in orientation, and experimental or quasiexperimental paradigms have predominated. Despite prominent psychologists' admission that studies of intergroup conflict need to consider structural variables (Alderfer & Smith, 1982; Billig, 1976; Ring, 1967; Steiner, 1974), most research has continued to focus on attitudes, traits, or interpersonal dynamics, with occasional work on ethnicity or organizational subunits.

Consistent with this micro focus, empirical studies of conflict have been limited to people or groups within single organizations. To date, research analyzing antecedents or correlates of conflict across a sample of organizations has not taken place. This lack limits theoretical knowledge as well as practical application because considering only one organization at a time makes it difficult to tell whether levels of conflict are comparatively high or

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low. Such restriction is a problem because most theorists have agreed that a certain degree of conflict is an endemic and perhaps positive factor in organizations yet at the same time have recognized that beyond a certain point, conflict is destructive (Benne, 1979; Coser, 1956; Janis, 1972; Robbins, 1974; Thompson, 1965; Schmidt & Tannenbaum, 1960; Walton, 1968). Theoretical and experimental work does little to identify thresholds at which conflict becomes problematic in an organization, and applied work by definition is undertaken in contexts where levels of conflict are considered unacceptable. No research that I am aware of has compared samples of high- and low-conflict organizations.

The approach taken here complements and extends traditional research in a number of ways. First, it uses a relational methodology to examine a subject that hitherto has been studied with nonrelational data. Second, the theoretical insights of a network perspective are applied to develop and measure concepts used in earlier research. Third, comparing organizations that have reached disruptive levels of conflict to normal, nonpathological organizations highlights the practical value of the results.

THE CONTACT HYPOTHESIS

Although most of the literature on conflict has emphasized a micro, or process (Thomas, 1976), approach, one structural argument surfaces repeatedly across a range of disciplines and approaches. Expressed simply, the "contact hypothesis" states that contact between different social units reduces conflict levels. This concept has been most prominent among students of race relations, but community, social anthropology, and organization studies have offered similar notions (Allport, 1954; Amir, 1975; Coleman, 1957; Levine, 1965; Mair, 1972; Murphy, 1956; Murphy & Kasdan, 1959; Oaker & Brown, 1986).

At least three causal explanations may be advanced for the general observation that cross-cutting ties, or contacts between social units (Billig, 1976), reduce intergroup conflict. Homan's (1950) classic proposition that activity leads to interaction, which leads to sentiment, offers one possible rationale. If members of different groups interact, they should develop positive sentiment for one another over time, which should help attenuate intergroup conflict.

A prominent feature of competing groups is the tendency for their members to become more cohesive internally while developing negative stereotypes and other perceptual distortions of those outside their group (Blake, Shepherd, & Mouton, 1964; Coleman, 1957; Schein, 1970). Increased cohesion leads to pressure to conform to group norms, reducing in turn the group's ability to process novel and dissonant information (Hensley & Griffin, 1986; Janis, 1972; Schein & Bennis, 1965). Polarization and disruptive conflict are often the result.

Thus, a second causal explanation lies in the ability of intergroup contacts to combat polarization by maintaining the permeability of group

boundaries. Intergroup contacts serve as conduits for information contradicting group biases and provide external loyalties that reduce the importance of ingroup membership and moderate pressures for conformity and radicalism (Ashmore, 1970).

A third function of intergroup contact is providing channels for dispute resolution. Frequent interactions between groups permit resolution of issues as they arise, avoiding the accumulation of grievances and development of grudges (Newcomb, 1947; Thomas, 1976). Frequent contact also makes behavior less political than it is when intergroup meetings are infrequent and formal (Patten, 1970).

Of course, many contingencies may moderate the effects of intergroup contact on conflict. Status differences, conflicting or congruent goals, and levels and types of interdependence have all been shown to moderate the effect of cross-cutting ties on conflict (Amir, 1975; Hewstone & Brown, 1986; Pettigrew, 1971; Sheriff, 1967). However, the independent discovery of the conflict-reducing properties of intergroup contact in a variety of settings across cultures argues that the principle has some general validity.

If there is scholarly agreement that intergroup contact generally reduces conflict, there is little clarity about exactly how much and what kind of contact it takes. Aside from general findings that contacts should be positive, or cooperative, rather than negative, or competitive, there is little guidance in the relevant literature about the nature of the contacts. Much of the literature is silent on the subject, and in the experimental research, frequency and type of contact have not been measured precisely. Only the literature on ethnic relations has undertaken to examine the question in some detail, and much of this material is of limited applicability to organizational conflict.

There is some consensus in the literature on race that intimate rather than casual contact between races is necessary to reduce prejudice (Amir, 1975; Ashmore, 1970; Jordan & West, 1971). Studies have variously defined the degree of intimacy necessary (cf. Deutsch & Collins, 1951; Chadwick-Jones, 1962; Jahoda & West, 1951), but a high frequency of contacts or friendship ties figures in most studies. In the race relations literature, causal explanations for the efficacy of intimate contact in reducing conflict tend to support the argument that frequent interaction leads to positive sentiment (Amir, 1975; Ashmore, 1970; Jordan & West, 1971), which in turn reduces conflict.

It is reasonable to expect that some kind of affective experience is necessary to overcome racial prejudice, given the strong emotional overtones of race relations. However, this likelihood does not disconfirm the other two explanations, which are grounded in theories of group interaction quite unrelated to the dynamics of ethnic relations but germane to internal organizational processes.

A probable corollary of the contact hypothesis is the idea that high levels of intragroup contact and identification may lead to intergroup differentiation, or perceptual distortions of outgroups, and therefore to conflict. Janis (1972) posited excessive ingroup intimacy as a major contributor to

"groupthink." Brown, Condor, Mathews, Wade, and Williams (1986) found an association between ingroup identification and differentiation in one organization, and Downing and Monaco (1986) found that manipulating ingroup contact influenced differentiation in a field experiment.

No research to date has considered the impact of the frequency of internal group contacts on conflict in ongoing organizations. And none of the studies cited has gathered detailed information on the frequency and patterns of contact within and between groups, for only sociometric techniques can generate such data.

Social Networks

The objective of social network analysis is to understand the pattern and content of the interactions that take place within and between social units. For this reason, such analysis brings fresh methodological and conceptual power to tests of the contact hypothesis. Social network analysis defines networks as sets of ties linking several individuals. Ties or contacts may be of different kinds, formal or informal, frequent or infrequent, affect-laden or purely utilitarian. Network analysts use the terms "transactional content" or "tie type" to identify the type of exchange or relationship that takes place between actors in a network (Granovetter, 1973).

One classification of ties particularly germane to the contact question is the distinction between strong and weak ties first proposed by Granovetter (1973). Granovetter defined tie strength as a function of three factors: (1) frequency of contact, (2) reciprocity—of favors and obligations, for instance—and (3) friendship. Thus, strong ties are frequent contacts that almost invariably have affective, often friendly, overtones and may include reciprocal favors. Weak ties are infrequent contacts that, because they are episodic, do not necessarily have affective content. Research on strong and weak ties has attributed different functions to each (Granovetter, 1973, 1982; Nelson, 1986). People use strong ties for political mobilization and solidarity and weak ties for the transmission of novel information and diffusion of innovation.

The network concept of strong and weak ties is quite similar to the concept of intimate and casual contact found in the ethnic relations literature. The similarity calls to mind the possibility that strong ties between groups may reduce disruptive conflict in organizations. However, researchers have not yet applied the findings on tie strength to an analysis of conflict.

Without explicitly linking the concept of tie strength and the contact hypothesis, Krackhardt and Stern (1988) made a strong case for the efficacy of cross-cutting strong ties as a conflict reduction mechanism, arguing that the existence of friendship ties between organizational units reduces conflict and facilitates cooperation, thus increasing organizational effectiveness in times of crisis. Presumably, weaker ties would not be sufficient to overcome units' self-interest and prevent conflict.

Krackhardt and Stern presented laboratory data supporting their argu-

ments, but their dependent variable was crisis adaptation, not conflict.¹ The present study extended the Krackhardt-Stern approach in three ways: (1) Field data were used to replicate findings from the laboratory. (2) Weak ties as well as strong ties were related to conflict levels. (Krackhardt and Stern considered only strong ties.) (3) Configuration of contacts was studied across high- and low-conflict organizations, making it possible to go beyond the general question of ingroup and outgroup ties to examine specific structures of interaction associated with high and low conflict.

The ability to examine specific patterns of interaction is an aspect of network analysis that other methodologies lack. Several different patterns of contact could lead to the same number of internal and external ties. For example, all groups could make outgroup ties with one powerful coalition; or outgroup ties could be evenly distributed across all groups.² Another possibility is a hierarchical pattern in which groups initiate external ties only with adjacent levels. Also, organizations frequently contain pockets of isolated individuals who do not themselves belong to a group but who have ties to individuals in several groups. By exploring patterns of contact in a number of ongoing organizations researchers stand to gain a fuller picture of the structural antecedents of organizational conflict.

Hypotheses

The foregoing discussion suggests two unambiguous hypotheses about social networks and intergroup conflict as well as a more speculative proposition about tie configuration and conflict in organizations.

Hypothesis 1: Low-conflict organizations will feature more frequent outgroup, or external, strong ties than high-conflict organizations.

This is a simple extension of the Krackhardt-Stern hypothesis and is consistent with the ethnic relations literature positing intimate contact as a conflict-reducing mechanism.

To support this hypothesis, it is necessary to show that strong ties between groups, not just contacts in general, are associated with low conflict levels. I took two steps to test the hypothesis, first comparing the total number of between-group contacts in high- and low-conflict organizations, irrespective of tie strength, and then repeating the comparison, separating strong and weak ties. I expected to find significantly more strong ties between groups in low-conflict organizations, after controlling for overall frequency of contact.

A second hypothesis was derived from the argument that excessive intragroup intimacy may ultimately foster conflict by distorting perceptions

¹ Existing network studies on conflict emphasize intragroup rather than intergroup or organizational level conflict (Kapferer, 1969, 1972; Roethlisberger & Dickson, 1939; Thurman, 1979).

² Krackhardt and Stern believed that evenly distributed ties are best in crises, but they did not test the proposition.

of outgroups, leading to one-sided ingroup loyalties and an environment generally favoring groupthink. It is not unreasonable to posit that within-group strong ties are consistent with such intimacy. Thus,

Hypothesis 2: The frequency of internal strong ties will be lower in low-conflict organizations.

As with Hypothesis 1, the effect of the overall frequency of ties had to be removed before I considered the frequency of strong ties. Intuitively, weak ties seem unlikely to foster the ingroup distortions that are the subject of this hypothesis.

An important factor here is the relationship between internal and external strong ties. It may be that strong outgroup ties attenuate the negative effects of ingroup intimacy. Thus, the real issue may not be the absolute frequency of ingroup ties, but rather their comparative frequency.³ Therefore, another test of the second hypothesis would be to compare the proportion of internal strong ties to external strong ties across the two groups. The persistence of a significant difference between high- and low-conflict organizations, with the overall propensity for strong ties controlled, would support Hypothesis 2.

If high- and low-conflict organizations do indeed vary in the number and strength of their ingroup and outgroup ties, it would be reasonable to expect that the sociometric structure of those contacts would also vary. Network analysts have identified a number of typical patterns of interaction (Bavelas, 1950; Breiger, 1979), but neither the literature on networks nor that on conflict provides much guidance as to what specific patterns might be found. The second part of this article offers an examination of the sociometric structure of high- and low-conflict organizations in order to explore the proposition that the configurations of contacts will differ in high- and low-conflict organizations. Any regularities observed in this exploratory exercise should provide more specific hypotheses for future research.

METHODS

Organizations

The data on the 20 organizations in this study were drawn from a data bank of information on 40 organizations, which I created in an effort to generate normative data about networks in organizations and their relation to performance. Most of the organizations in the data bank and all those studied were the subject of detailed case studies that included a brief history, an organizational description, and a summary of the major problems and challenges faced by management. Study participants were informed that data would be used for academic research only and that individual as well

³ In fact, Krackhardt and Stern built this argument into their measure of outgroup ties, but I preferred to look at both absolute and comparative levels of internal contact.

as organizational anonymity were guaranteed. I used identical data-gathering techniques in all the organizations. Although some of the 40 organizations in the data bank were my consulting clients, my only relationship to the organizations discussed herein was that of independent researcher.

A variety of organizations were studied, including manufacturing, service, public-sector, and private-sector entities. Although selection was not random, and I make no claim of representativeness, no one type of organization predominates. Voluntary organizations were the only obvious class not included. Table 1 provides a brief characterization of the 20 organizational units and the number of participants in each.

Network Measures

Network data were collected by giving each respondent a list of all other respondents in their organization or organizational unit and asking, "Indicate the number of contacts you have with each individual in an average

TABLE 1
Organizations Studied

Organizations	Number of Groups	Number of Participants
High conflict		
Coupon redemption center	3	20
1,000-bed community hospital	6	38
400-bed charity hospital	5	27
Municipal government executives	3	22
Family-owned funeral homes chain	3	18
Electric utility, executives	5	32
Electric utility, generation plant personnel	7	54
Public accounting firm	7	60
Local bank	4	24
Clothing store chain, regional personnel	3	20
Subtotal	46	315
Low conflict		
400-bed for-profit hospital	4	28
Hospital supply company	6	39
Regional council of governments	3	19
Budget unit of government agency	3	25
Food conglomerate, executives	3	18
Regional bank, operations personnel	3	20
Regional bank, trust department personnel	3	20
Defense contractor	3	24
Public accounting firm	5	33
Smelter	5	39
Subtotal	38	265
Total	84	580

week.”⁴ Individual responses were entered as rows into an n -by- n adjacency matrix, or sociomatrix, in which rows and columns represent individuals and cells represent the frequency of interaction between pairs of individuals. I created one sociomatrix for each organization or unit studied.

In all, data were received from 592 individuals, 580 of whom returned usable questionnaires. I limited the number of respondents from each organization or unit to 90, both to maintain the manageability of the data and to assure that the data sets would be roughly comparable. The number of possible contacts increases geometrically with the size of a network, but the time and resources needed to maintain contacts increase mathematically. Thus, very large networks contain mostly empty space and tend to be qualitatively different from smaller networks. This problem and the manageability problem increase dramatically as the number of network members approaches 100.

In order to keep the number of network members to no more than 90 while including different-size organizations, I began distributing questionnaires in large organizations at the top and worked down three hierarchical levels. If a unit or an organization contained fewer than 90 members, I gave questionnaires to all members. A number of smaller units from larger organizations were included so as not to overrepresent the executive levels of the large organizations. This top down approach probably somewhat skews the study toward managerial levels. Also, the upper limit on the size of data sets means that the results are not applicable to very large networks. This is a weakness common to nearly all contemporary studies of networks in organizations, be they theoretical or empirical.

Most of the units studied were discrete, autonomous organizations or semiautonomous divisions of conglomerates. Those few that were not were reasonably self-contained work units with few major external interdependencies. Data sets ranged in size from 18 to 60. None of the variables discussed herein were significantly correlated with the size of data sets or organizations. Had the size of data sets not been restricted by an upper limit, organization size would surely have influenced some network dimensions.

Conflict Levels

As mentioned above, an important aim of this research was to compare organizations where conflict has reached disruptive proportions with organizations whose performance has not been adversely affected by internal conflict. Measuring disruptive conflict is a challenge, first because no validated, reliable measures of conflict exist (Thomas, 1976) and second because social scientists have not yet developed conceptual criteria for differentiating between healthy conflict and disruptive conflict.

In the absence of more specific guidance from the literature, conflict is

⁴ Other network data were collected, but this article presents only data about the average frequency of weekly contact.

here defined as disruptive when it becomes sufficiently intense to adversely influence organizational performance. Field experience and anecdotal evidence from the popular business press suggest five events that commonly occur when conflict has reached sufficient intensity to prejudice organizational performance: (1) Recent turnover attributable to internal politics or incompatibilities. (2) Apathy or fatalism about external threats attributable to excessive infighting. (3) Inability to reach consensus on how to implement needed strategic or operational changes. (4) Recent intervention by external entities attributable to internal inability to make or implement decisions (externally imposed management changes, investigations, arbitration, litigation, etc.). (5) The presence of easily identifiable opposing internal factions.

A search of case notes on the organizations in the data bank for those events revealed 11 organizations in which at least one event was clearly present. I then chose another 11 organizations in which events indicating disruptive conflict levels were clearly absent. My intent was to provide a contrast between normal and pathological levels of conflict rather than to find extremes of harmony and disharmony.

After the two groups of organizations were chosen, two additional raters independently reviewed the case studies for the 22 organizations, placing them in high- or low-conflict categories. Both raters agreed on the classifications, except in the case of one low-conflict organization, which was dropped. In order to maintain equivalency, I dropped one randomly chosen high-conflict organization.

Managers from 19 of the 22 organizations provided their perceptions of conflict levels on a Likert scale of 1 to 6. The mean for the low-conflict group was 1.44, and for the high-conflict group it was 3.10 ($t = 3.59$, $p > .005$). These scores were significantly correlated with the number of events indicating disruptive conflict taken from the case studies ($r = .71$, $p > .005$).

Identification of Groups

With the high- and low-conflict aggregates constructed, the next step was to identify groups in the 20 organizations and to compute the number of strong and weak ties within and between groups. I used a clustering algorithm designed for network analysis called CONCOR (Breiger, Boorman, & Arabie, 1975) to identify groups. CONCOR iteratively correlates column vectors of a matrix with one another until the correlations approach $+1$ or -1 . Positive and negative correlations are then separated to produce two groups. This process is repeated for the separate groups until the desired number of groups is obtained.⁵

In practice, CONCOR identifies groupings in which all members have frequent contact with one another, if such groups exist. Of course, frequently organizations contain isolates, or "liaisons" (Schwarz & Jacobson, 1977),

⁵ For a simplified explanation of CONCOR and other algorithms used in network research, see Rogers and Kincaid (1980).

individuals who have very few ties or ties to more than one group. CONCOR groups such individuals together according to the similarity of their networks. The results obtained using CONCOR are not unlike those obtained from other network algorithms applied in organizations (cf. Richards, 1975; Schwarz & Jacobson, 1977; Weiss & Jacobson, 1955).

The sociomatrix from each organization was divided into groups of ten or fewer individuals. I used ten as a cut point because of the tendency for larger aggregations to contain subgroups. Researchers in group dynamics have long recognized a group size of five to ten as ideal (Thomas & Fink, 1963). The division yielded 84 groupings from 580 usable questionnaires, 46 groups for 315 actors in the high-conflict organizations, and 38 for 265 in the low-conflict organizations.

Four values computed from each sociomatrix are of interest here: strong ties within groups (internal strong ties), strong ties between groups (external strong ties), weak ties within groups, and weak ties between groups. Strong ties were defined as involving contacts occurring six or more times in an average week and weak ties as involving one to five average weekly contacts. It was reasoned that most people who interact at least once in an average workday will develop some positive sentiment and reciprocity over time.

Ideally, strong ties would be defined by the presence of friendship and reciprocity in addition to frequency of contact. However, the multiple measures necessary for scale construction prove cumbersome in network research. In practice, frequency of contact, friendship, and reciprocity are closely associated, and the network literature has used frequency of contact as a surrogate for the other two components of tie strength. In his seminal work on weak ties, Granovetter (1973) found high frequency of contact to be accompanied by reciprocity and friendship and used contact frequency as his only measure of tie strength. In a community study measuring both friendship choices and frequency of contact, I (1983) also found that the two measures produced almost identical results.

RESULTS

Group Ties

Table 2 contains totals of internal and external strong and weak ties for the high- and low-conflict organizations. Of the 4,312 ties in the high-conflict organizations, 3,033 (70%) are external. Of 4,796 ties in the low-conflict organizations, a comparable percentage (3,468, or 72%) are external. However, the frequency of strong external ties varies dramatically between the high- and low-conflict organizations. Forty percent of the low-conflict organizations' external ties are strong, versus 16 percent for the high-conflict organizations. This pattern supports Hypothesis 1, which specifically posits that strong ties between groups inhibit disruptive conflict.

About 13 percent (12.9) of the low-conflict contacts are strong internal ties, compared to 10.7 percent of the high-conflict contacts. This difference is not large, but it is contrary to prediction: Hypothesis 2 predicts higher

TABLE 2
Tests of Independence for Subtables

Tie Strength	Internal	External
Strong ties		
High conflict	465	411
Low conflict	619	1,052
$\chi^2 = 50.2$		
$df = 1, p < .0001$		
Weak ties		
High conflict	814	2,822
Low conflict	709	2,416
$\chi^2 = 0.9$		
$df = 1, n.s.$		

internal contact for high-conflict organizations. On the other hand, the proportion of strong ties that are internal differs considerably in the low- and high-conflict organizations. In the latter, 53 percent of the strong ties are internal, compared to only 37 percent in the former, which suggests that the relative concentration of internal strong ties plays a more important role than their absolute frequency.

The most obvious inferential test for the data is a simple test for independence performed separately on subtables for strong and weak ties (see Table 2). This test yielded a substantial association for the strong ties ($df = 1, \chi^2 = 50.2, p < .0001$) but no association for the weak ties ($\chi^2 = .90, n.s.$). Moreover, the residuals appeared to be as expected. The high-conflict organizations have within-group contact that is higher than expected, and the low-conflict organizations have between-group contact that is higher than expected.

The separate tests do not take into account overall propensities to initiate strong or weak ties or the comparative frequency of internal or external contacts, independent of tie strength. Fitting log-linear models to the values in Table 2 controls for those tendencies and provides a more complete statistical evaluation of the results obtained. The possible associations in the table can be modeled thus (cf. Agresti, 1984; Bishop, Feinberg, & Holland, 1975; Marsden, 1980):

$$\log m_{ijk} = \mu + T_i + C_j + W_k + TC_{ij} + TW_{ik} + CW_{jk} + TCW_{ijk},$$

where

T = tie type (i = strong or weak),

C = conflict (j = high or low),

W = contact (k = internal or external), and

m = frequency of contact.

The model $\log m = \mu + T_i + C_j + W_k + TW_{ik}$ controls for the overall number of strong and weak ties (T), the total number of contacts made in the high- and low-conflict organizations (C), the overall number of internal and

TABLE 3
Log-Linear Models of Complete Table

Models ^a	df	χ^2	Reduction
TW,C	2	302.50	
TW,CW	2	298.20	.014
TC,TW	2	61.14	.796
TC,TW,CW	1	33.83	.888

^a T = tie strength, C = conflict, W = internality-externality.

external ties (W), and the tendency for there to be more weak ties between groups (TW). It serves as a base line against which to compare the effects of strong and weak and internal and external ties in the high- and low-conflict aggregates.

The model $\log m_{ijk} = \mu + T_i + C_j + W_k + TW_{ik} + TC_{ij}$ removes the effect of differences in the overall propensities of the members of the high- and low-conflict organizations to make strong ties, independent of whether those ties are internal or external.

The model $\log m_{ijk} = \mu + T_i + C_j + W_k + TW_{ik} + CW_{jk}$ removes the effect of differences in the overall propensities of high- and low-conflict organizations for internal or external ties, independent of whether those ties are strong or weak (Table 3).

Finally, the model of no three-way interaction, $TC + CW + TW$, presents the null hypothesis that there is no association between tie strength, internality and externality, and conflict.

Fitting the TC,TW model reduces chi-square from 302 to 61.2, a proportional reduction of 79 percent, indicating that strong ties are much more prevalent in low-conflict organizations. (Reduction in chi-square is very loosely analogous to variance explained in regression.) The model of no three-way interaction further reduces chi-square to 33.83, but the null hypothesis is still rejected at .000. The CW,TW model, on the other hand, provides only minimal improvement in fit, from 302.5 to 298.2, indicating that the two aggregates of organizations are not significantly different in overall distribution of internal and external ties, if tie type is not considered.

The log-linear results suggest three conclusions. First, there is a significant association between conflict, tie strength, and the externality or internality of contacts, after other variables have been controlled for. Second, it appears that strong ties may reduce disruptive conflict whether contacts take place within or between groups. That relationship, which was not hypothesized, merits attention in future research. A posteriori, I am tempted to speculate that strong within-group ties are actually beneficial to organizational harmony if balanced by a number of strong ties linking groups. It might be argued that strong ties help to maintain harmony inside groups, thus contributing to overall harmony in an organization. Third, high- and low-conflict organizations have similar overall proportions of internal and

external contact. The difference, therefore, lies in the distribution of strong and weak ties within and between groups.

Conflict and Network Configuration

The results of the CONCOR analysis offer some evidence that organizations with disruptive levels of conflict suffer a lack of strong between-group ties and have a comparative abundance of strong within-group ties. However, previous research on neither groups nor networks provides clues as to what structural patterns strong ties assume in high- and low-conflict organizations. Because of this lack of theoretical direction, I formulated no *a priori* hypotheses about the actual structure of group relations, aside from the proposition that network structures would be different in high- and low-conflict organizations. In an effort to explore this proposition, I examined "blockmodels" (White, Boorman, & Breiger, 1976), graphic representations of network configuration, for recurring structural patterns.

The construction and interpretation of blockmodels can best be explained through an example. Groupings of interest, in this case the CONCOR groupings, are placed together in an adjacency matrix, shown in Table 4. Individual responses are entered in the same order as columns, so the first row lists person 1's responses regarding all subjects and column 1 lists all respondents' contacts with person 1. The diagonal of the adjacency matrix is disregarded. If the matrix is divided into regions defined by the CONCOR groupings, a detailed picture of network structure emerges. Region 1,1 in the matrix displays the internal network of group 1; region 1,2 contains group 1's perceptions of contact with group 2; region 2,1 contains group 2's perceptions of contact with group 1, and so forth. Visual inspection of the matrix indicates that regions 1,1 and 4,4 are much fuller than regions 2,2 and 3,3, suggesting that groupings, or blocks, 1 and 4 are real groups but that blocks 2 and 3 are aggregations of isolates who may have ties to others but do not belong to a group. Looking off the diagonal, it would appear that blocks 1 and 4 are well integrated and that block 4 has more ties to the isolate blocks (2 and 3) than block 1.

Making a "density table" of the matrix allows precise comparison of regions and reduces the information contained therein to more manageable proportions. The sum of contacts in a region is divided by the area, or number of possible relationships; for example, the density of region 1,3 is $40/25$, or 1.6. A density table confirms impressions based on a raw adjacency matrix without requiring perusal of each individual response.

A density matrix can be reduced still further by calculating the mean density of an entire matrix and denominating values above and below the grand mean as one and zero blocks. This results in a blockmodel, or reduced-form image, that captures the essential features of the adjacency matrix and facilitates comparison across cases.

Blockmodel analysis is particularly appropriate for the task at hand because, as Breiger argued, "by providing a systematic framework for rela-

TABLE 4 (continued)

Region <i>i</i> ,1					Region <i>i</i> ,2					Region <i>i</i> ,3					Region <i>i</i> ,4					Blockmodel							
					Area					Density																	
7	5	4	1	0	5	1	5	2	2	0	5	5	3	1	0	6	5	2	10	30	80	30	2	5	5	10	5
1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	10	2	0	1	0	0	0
3 <i>j</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	0	6	0	0	0	0	0	0
2	5	1	12	0	1	0	2	0	2	1	0	0	2	0	1	0	0	0	0	8	8	1	0	0	0	10	2
0	0	1	0	0	0	0	2	2	0	0	1	1	0	0	8	1	2	0	0	2	6	1	1	1	1	2	1
15	10	4	5	0	8	7	15	8	10	8	7	7	15	3	8	1	0	5	1	0	8	5	5	2	0	15	5
15	5	5	4	0	4	3	5	5	5	2	1	1	3	3	25	10	10	8	15	5	0	12	4	5	2	5	5
5	5	3	5	5	5	0	4	3	2	1	1	1	1	0	10	1	0	0	1	5	10	0	0	0	0	2	0
10	5	5	4	1	4	5	7	7	7	7	4	4	7	3	7	7	3	3	7	14	7	5	0	22	2	7	7
15	0	0	0	0	0	0	0	1	2	0	0	0	1	0	0	2	0	0	3	2	2	0	20	0	0	5	99
1	1	0	0	1	7	0	1	0	0	0	0	0	0	0	2	2	0	0	0	2	0	1	0	2	0	2	2
5	3	2	2	0	5	3	5	3	5	3	2	2	5	2	5	0	0	5	2	15	3	2	0	5	3	0	5
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	0	50	0
Sums					Area					Density										Blockmodel							
182	55	40	170		20	50	25	40				9.10	1.10	1.60	4.25												
65	124	66	229	+	50	90	50	80				1.30	1.37	1.32	2.86												
41	43	46	230		25	50	20	40				1.64	0.86	2.30	5.75												
146	240	143	480		40	80	40	56				3.65	3.00	3.57	8.57												

* In the tables Sums, Area, Density, and Blockmodel, *ij* corresponds to region *ij* of the larger table. For example, the sum of contacts in region 1,3 is reported in cell 1,3 of Sums (40); the area of region 1,3 is found in cell 1,3 of Area (25 = 5 × 5).

tional description, blockmodel analysis bridges the gulf between specific case studies and general hypotheses" (1979: 21). In other words, by examining the blockmodels of each organization studied, it is possible to compare the structures of the two aggregate groups without ignoring the individuality of each organization.

Space will not permit presentation of all 20 blockmodels and their corresponding density tables. Instead, I offer a more detailed description of four recurring patterns typical of the high- and low-conflict organizations studied.

The first blockmodel, which can be called an unconnected clique structure or multiple caucus model (Breiger, 1979), is a straightforward extension of the contact hypothesis. Here, high diagonal densities—regions 1,1 and 2,2, for instance—and low off-diagonal densities indicate unconnected cliques or coalitions that have few contacts with other coalitions. Of the high-conflict organizations, 5 of the 10 studied fit this category fairly well. Among the low-conflict organizations, this pattern was absent.

High-conflict teaching hospital. The management structure of a 1,000-bed teaching hospital unable to cope with the conflicting demands of multiple constituents provides a typical example of the unconnected clique structure (see Table 5). The hospital is community-owned but is also affiliated with a major regional university. Indigent admissions are high, and various community groups simultaneously press for cost reductions, more sophisticated care, and enlarged facilities. The university and its doctors also make demands that are somewhat different from those of other constituents.

In this divisive political environment, few management teams have survived for long. In six years, the hospital has had four different chief executives, and the incumbent of virtually every key position has changed at least once. Top management is so overcome by outside pressures that it has been unable to give adequate attention to internal concerns. Moreover, community cleavages have found their way into employee groupings in the hospital.

Using CONCOR, I divided 38 managers into six groups forming three isolated caucuses. The first two groups contain top management and the heads of important ancillary and support services such as the radiology, laboratory, and pharmacy departments. Group 1 is loosely tied internally and has few external contacts except for those with group 2. Groups 3 and 4 contain employees who perform financial services—accounting and data processing and keeping patient accounts and records, respectively. They are very cohesive internally and entertain reciprocal contacts but are also isolated from the rest of the organization. Groups 5 and 6 contain noncritical and critical nursing and support employees. They have strong ties to one another but minimal contact with the rest of the organization.

Under this network configuration, the cohesive financial employees made progress in controlling costs, without the support of the ancillary or nursing employees. The loosely knit top management never did penetrate the other two caucuses, and eventually most of its members were dismissed.

TABLE 5
Blockmodels of Selected High- and Low-Conflict Organizations

Organizations	Blocks	Densities					Blockmodels				
High-conflict teaching hospital Mean density = 1.27											
	1	0.83	1.52	0.77	0.18	0.52	0.53	0	1	0	0
	2	1.79	2.03	0.83	1.17	0.50	0.73	1	1	0	0
	3	0.34	0.57	11.30	1.65	0.10	0.02	0	0	1	0
	4	0.82	0.75	1.70	11.20	0.25	0.30	0	0	1	0
	5	0.55	0.47	0.17	0.21	1.60	3.57	0	0	0	1
	6	0.63	0.40	0.22	0.32	3.33	2.58	0	0	0	1
Low-conflict smelter Mean density = 2.19											
	1	2.68	0.96	0.23	0.09	0.46		1	0	0	0
	2	2.26	11.50	0.23	0.43	0.68		1	1	0	0
	3	3.55	0.28	2.67	0.48	1.54		1	0	1	0
	4	3.08	0.07	2.04	8.20	3.92		1	0	0	1
	5	2.38	0.26	1.27	2.22	4.87		1	0	0	1
High-conflict charity hospital Mean density = 2.75											
	1	0.66	2.00	3.91	0.77	3.66		0	0	1	0
	2	2.29	3.61	3.14	4.06	3.64		0	1	1	1
	3	3.08	1.21	4.50	1.20	0.43		1	0	1	0
	4	1.22	4.28	2.25	1.33	11.50		0	1	0	0
	5	0.08	0.75	0.31	0.75	1.00		0	0	0	0
Low-conflict for-profit hospital Mean density = 3.26											
	1	9.10	1.10	1.60	4.25			1	0	0	1
	2	1.30	1.37	1.32	2.86			0	0	0	0
	3	1.64	0.86	2.30	5.75			0	0	0	1
	4	3.65	3.00	3.57	8.57			1	0	1	1

Low-conflict smelter. Interestingly enough, four or five of the low-conflict organizations had the same clique structure, with the critical difference that one group had ties to all the other groups, apparently providing a bridge for coordination and conflict resolution. The second blockmodel in Table 5 is from a copper smelter that experienced a rather tumultuous downsizing and union decertification a year and a half before data were collected. Not only was there considerable turnover at the shop-floor level, managerial changes were also widespread. During this period, most dissidents left the company, and the plant manager and his lieutenants, who were mostly employees of the personnel department, consolidated control over all remaining groups. Most departments then reported directly to top management. Since that time, relationships at the plant have been peaceful, and efficiency is much higher than the industry average.

Block 1 consists of top management and the personnel department. (It appears that the decertification and downsizing brought personnel into the limelight.) This group is firmly connected to all remaining groups. Group 2 represents the "technical core" (Thompson, 1967) of the organization, responsible for the primary output of the factory. It is strongly tied internally and quite isolated, except for its tie to top management. Group 3 contains maintenance, receiving, shipping, and other support activities. It receives some contact from group 4, a subunit that recovers by-products of the activities of group 2. Group 5 contains indirect labor, such as sales, accounting, data processing, and purchasing employees.

The ties made by other groups with plant management (block 1) are not reciprocated, suggesting a dominant-subordinate relationship. In some variants of this pattern, ties between a leading or coordinating group and other groups are reciprocal, but my personal field experience suggests that greater stability, if not goodwill, is enjoyed in organizations where other groups initiate more ties with the lead group than that group reciprocates.

High-conflict charity hospital. Ironically, the most conflict-ridden organization in the study featured more between-group strong ties than most of the low-conflict organizations. It was a hospital run by a religious order with a 350-year tradition of charitable service. The order had recently begun to emphasize the need for better financial results and had brought in its first lay chief executive officer (CEO). Not all members of the order agreed that the change to professional management was for the best and several resented what they considered excessive concern over financial performance to the detriment of their charitable objectives. The new CEO, who was hired away from another local hospital, brought a number of subordinates with him and made several new hires. The remaining lay subordinates were divided in loyalty between different members of the order and the new management. After almost a year of new management, the hospital's situation remained chaotic, its market share was falling, morale was low, and no coherent strategy had been put in place. The network (Table 5) reflects the turmoil that reigned in this organization.

The CONCOR groupings show considerable diversity and some confu-

sion. Block 1 combines the CEO with subordinates of the administrative director and chief financial officer. Block 2 combines employees reporting directly to the CEO, except for the chief financial officer, with several subordinates of the chief operating officer. Block 3 contains financial managers and managers for quality assurance and utilization review. Block 3 is the most logical of the groupings, although it again combines subordinates of different executives. Block 4 is diverse, containing people in such unrelated functions as nursing, data processing, and maintenance. Block 5 contains social services, public relations, and kidney center employees.

Only blocks 2 and 3 have internal densities above the mean of the matrix. Perhaps noteworthy is the fact that these two blocks also have the clearest functional identities: operations for group 2 and finance for group 3. As in the first case presented, the teaching hospital, there is no identifiable top-management block with internal ties. The other three blocks make and get contacts but share little internal contact. Block 5 receives attention from blocks 1, 2, and 4 but gives almost none in return. Such asymmetries are typical of powerful groups, but block 5 contains no individuals in easily recognizable, influential positions.

Operations (block 2) makes contacts with blocks 2, 3, and 4, but only block 4 fully reciprocates. Block 3 receives contacts from two blocks but makes most of its ties with block 1. Thus, two blocks, 3 and 5, have the most ties made with them, yet they contain only one top manager—the chief financial officer—between them. In sum, the network of this organization makes little sense in relation to traditional hierarchical or functional criteria.

Low-conflict for-profit hospital. The network of a 300-bed for-profit hospital in the same community can be compared to the high-conflict charity hospital. The for-profit hospital had experienced some administrative turnover and managerial restructuring in the last five years, but the process was not tumultuous, and internal conflict was not a significant problem. Public image, morale, and efficiency were good, and market share was increasing (see Table 5).

Using CONCOR, I divided 28 upper-level employees into four groupings with clear roles. Block 1 contains top management and financial executives. Block 2 principally consists of the employees of ancillaries like the laboratory, cardiology, pharmacy, and radiology departments. Block 3 contains nursing management. Several different types of employees appear in block 4, but all have environmental, boundary-spanning roles: examples are personnel, medical staff coordination, and patient relations employees.

Like the charity hospital, this organization contains aggregations of isolates (blocks 2 and 3) and has no one group that provides a bridge to all blocks. There are significant differences, though. The isolate block 2 initiates few ties but also has few ties made with it. In the charity hospital, the isolate blocks maintain ties with the two other blocks simultaneously. In the present example, the isolate block 3 is firmly tied only to block 4. Moreover, all ties in the present blockmodel are reciprocal. The top-management team is strongly tied to the boundary-spanning block 4, which in turn is tied to the



nursing block. The ancillary block is not firmly attached to any group; it has ties evenly spread between blocks 1, 2, and 3 and has somewhat greater contact with block 4.

The clearly identifiable roles of these blocks and their logical interrelations create an impression of order and stability. This impression conformed to my subjective impressions of the organization. Top management had clearly established its role as that of controlling costs and promoting efficiency, albeit from a distance. The boundary-spanning group, composed mostly of the second level of management, took care of operational details and mediated between the environment and the technological core (block 3). Finally, the ancillaries were given free rein, subject to the performance standards of top management.

The contrast between these two hospitals illustrates the major differences between the remaining high- and low-conflict cases. High-conflict organizations seldom produced clearly identifiable groupings with strong functional, hierarchical, or spatial commonalities. The groupings of low-conflict organizations, on the other hand, were clearly differentiated. Common to high-conflict organizations were blocks with strong internal ties that appeared to compete for the divided loyalties of isolates, blocks with few internal or external ties. Although low-conflict organizations may feature unreciprocated ties to a dominant managerial group, unreciprocated ties were present across a variety of groupings in the high-conflict organizations.

CONCLUSIONS

At the aggregate level, the relationship between social networks and conflict in organizations appears simple: strong ties are generally associated with an absence of disruptive conflict, and strong ties between groups are especially typical of low-conflict organizations.

Examining specific sociometric structures, however, reveals a more complex picture. About half the organizations studied consisted of sets of groups or collections of individuals sharing many contacts with one another. In those organizations, the absence of a dominant group with strong ties to all other groups was associated with disruptive conflict.

The rest of our organizations contained one or more nongroups, collections of individuals with few internal ties, and lacked a dominant group providing a bridge to all other groups, or blocks. In these more complex cases, the composition of blocks appeared to be a key difference between high- and low-conflict organizations. Organizations in which members of individual blocks shared a common function, position, or role—in other words, where block composition made sense—were more prevalent where conflict was low. Also, there was a tendency for high-conflict organizations to contain competing networks, with two or more blocks making ties to the same third party. Further, unreciprocated ties between blocks were more frequent in high-conflict organizations.

What emerges is an image of chaos in the high-conflict organizations

versus an image of order and meaning in the low-conflict ones. There is a recent tendency to admit and sometimes even celebrate the ambiguity and chaos that find their way into all organizations (Cohen, March, & Olson, 1972; Hedberg, Nystrom, & Starbuck, 1976; Peters, 1987). The results of this research suggest that this chaos should not extend to the network structure of an organization. Rather, low-conflict organizations contain consistent, if not homogenous, groups bound together in an orderly manner by strong ties.

In the same vein, it would appear that intergroup contacts should not be randomly distributed across an organization, nor should redundant or duplicate networks be fostered in an attempt to reduce disruptive conflict. The idea that evenly distributed ties will stimulate generalized organizational loyalty, thus reducing conflict, is intuitively appealing (Krackhardt & Stern, 1988). However, the present research does not support that idea. Rather, it seems that conflict is less probable when one dominant group mediates between all other groups or when a hierarchy links groups serially. Again, the guiding principle is order rather than ambivalence.

Another potentially important finding is the preponderance of strong ties in low-conflict organizations, in addition to the comparative abundance of external strong ties. This unanticipated result, asymptotically as strong as support for the contact hypothesis, may have important theoretical and practical implications. Is frequent personal contact essential to organizational harmony? If so, why? It is already known that managers spend large amounts of their time interacting with one another (Kotter, 1986; Mintzberg, 1976). Do they need to interact still more?

The limitations of this research raise still other questions and research issues. The conceptualization and measurement of strong ties and disruptive conflict call for additional work. The relationship between formal organizational structure and network structure also calls for exploration. Future research might explore whether matrix structures foster competing networks, leading to conflict, and whether other formal structures have different impacts on network structure. Perhaps functional structures favor clique network structures, and divisional structures favor more complex network configurations.

Clearly, network structure is not the only antecedent of conflict in organizations. Unfortunately, the small number of organizations included in this study precluded examination of other contextual variables related to both conflict levels and networks. Moreover, it is reasonable to argue that conflict alters network configuration and content, perhaps reducing strong ties and disrupting integrative mechanisms. Most likely, causality is reciprocal, but the scope and methods of this research were inadequate to address the issue. Future research should focus on networks as both a cause and a consequence of conflict in different organizational settings.

Finally, given the recurring conclusion that investigators in different disciplines using different methodologies have reached, that cross-cutting strong ties reduce conflict, how does an organization go about forging such ties? Both Granovetter (1973) and Krackhardt and Stern (1988) have sug-

gested that strong ties between groups do not occur naturally. In the present research, the number of external strong ties was much lower than the number of external weak ties, but external strong ties did exist in significant quantities. Where do those ties come from? Are they the result of formally mandated organizational arrangements or of informal processes? What role might physical layout play? What impact might turnover rates, age, distribution, seniority, and other demographic factors have?

One effect of team building and other organizational development interventions may be to facilitate the formation of strong ties between groups. Interventions, structural and otherwise, doubtless influence tie strength and configuration in organizations. Network analysis is useful to the study of organizations because it provides detailed descriptions of phenomena hitherto addressed only in abstract statements. However, to realize its full potential, network analysis must move beyond mere description to make normative statements about what kinds of networks support organizational effectiveness and how such networks are formed and maintained.

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Reed Elliot Nelson is assistant professor of management at Louisiana Tech University. He holds a Ph.D. degree from Cornell University and an M.A. degree from Brigham Young. His primary research areas are organization design, comparative management, and network analysis in organizations.

BEYOND SIMPLE DEMOGRAPHIC EFFECTS: THE IMPORTANCE OF RELATIONAL DEMOGRAPHY IN SUPERIOR-SUBORDINATE DYADS

ANNE S. TSUI

University of California, Irvine

CHARLES A. O'REILLY III

University of California, Berkeley

Previous research on individual demographic characteristics has typically examined only direct effects on outcomes such as work attitudes and behavior. This investigation examined the multivariate effects of six demographic variables—age, gender, race, education, and company and job tenure—on superiors' ratings of performance and liking for subordinates and subordinates' role ambiguity and conflict. A field study of 272 superior-subordinate dyads produced results that support the notion that increasing dissimilarity in superior-subordinate demographic characteristics, referred to here as "relational demography," is associated with lower effectiveness as perceived by superiors, less personal attraction on the part of superiors for subordinates, and increased role ambiguity experienced by subordinates. These effects were found even after we controlled for the effects of simple demographic variables.

Demographic characteristics of individuals like age, gender, race, tenure, and education have long been considered important variables in psychological research (e.g., Zedeck & Cascio, 1984). For example, recent investigations have examined the effects of individuals' demographic attributes on outcomes such as performance, satisfaction, turnover, selection, and leadership (Blau, 1985; Parsons & Liden, 1984; Steckler & Rosenthal, 1985). This stream of research has documented results indicating that often demographic variables are significantly associated with characteristic perceptions, attitudes, or work outcomes. For instance, in a meta-analysis of age differences in job performance, Waldman and Avolio (1986) documented a pattern of decreases in performance at higher ages when performance was measured by supervisory ratings. Duchon, Green, and Taber (1986) found gender to reliably predict outgroup status in a leadership study. A large number of investigations have explored other demographic effects, including the effect of race on selection decisions (McIntire, Moberg, & Posner, 1980), tenure on turnover (Mitchel, 1981), and seniority on job performance (Gordon & Fitzgibbons, 1982). The modal study in this tradition examines the independent effects of one or more relevant demographic attributes on outcomes at the individual level. But does that approach adequately capture the full impact of potential demographic effects?

Viewing organizations as composed of multiple sets of relationships suggests that "the distributional properties of the demography of the organization . . . are . . . critical in understanding demographic effects in organizations. Therefore, it is important to employ methodologies that enable the researcher to capture the properties of the distribution" (Pfeffer, 1982: 278). For instance, the age of an individual may be related to performance or turnover (Cleveland & Landy, 1981; Mobley, Griffeth, Hand, & Meglino, 1979; Waldman & Avolio, 1986), but this says nothing about possible compositional effects of age distribution in the individual's social group. Previous research has found that being older or having longer tenure than the members of some immediate referent group is inversely related to propensity to leave, regardless of the absolute value of the relevant demographic variable (Rhodes, 1983). McCain, O'Reilly, and Pfeffer (1983) also showed that being older in a group dominated by younger members led to an increased propensity to leave among older workers. Wagner, Pfeffer, and O'Reilly (1984) found that within top management teams it was the relative difference in ages within groups that predicted individuals' leaving, not the individuals' ages *per se*.

The concept of organizational demography in the existing literature refers to the composition of a group in terms of the distribution of basic attributes such as age, gender, tenure, race, education, and so on among potential noninteracting members (Pfeffer, 1983). In this article, we use the term relational demography to refer to the comparative demographic characteristics of members of dyads or groups who are in a position to engage in regular interactions. In other words, we propose that knowing the comparative similarity or dissimilarity in given demographic attributes of a superior and a subordinate or of the members of an interacting work team may provide additional information about the members' characteristic attitudes and behaviors and, more important, insight into the processes through which demography affects job outcomes. So, what are the mechanisms through which relational demography may affect outcomes such as job attitudes, turnover, and performance? It appears that the cause of relational demographic effects may be a combination of a high level of attraction based on similarity in attitudes, values, and experiences (Byrne, 1971; Byrne, Clore, & Smeaton, 1986) and strong communication among the interacting members of a team or dyad (Roberts & O'Reilly, 1979). Byrne (1969, 1971) described the relationship between attraction and similarity as the similarity-attraction paradigm.

CONCEPTUAL BACKGROUND

Demography and Similarity-Attraction

There has been a voluminous amount of research on the similarity-attraction paradigm (Berscheid & Walster, 1969; Byrne, 1971; Harrison, 1976). That research provided substantial evidence, across diverse populations, on the strong association between similarity and interpersonal attrac-

tion. Although early research focused on attitudinal similarity, more recent research has shown that similarity on any number of dimensions may increase attraction (Baskett, 1973). For instance, Werner and Parmelee showed that similarity in pastime preferences can predict friendship and attraction. They noted that shared activities are "especially important in initial stages" (1979: 65) of friendship development. More recent research has also shown that dissimilarity can lead to repulsion (Rosenbaum, 1986), with differences between people increasing the distance between them and lowering interpersonal attraction and liking. In other words, people tend to be drawn to those who are similar to them in terms of demographic characteristics, activities, or attitudes (Byrne, Clore, & Worchel, 1966).

In addition to interpersonal attraction, similarity has also been found to have a positive effect on communication and integration in social groups. For example, Lincoln and Miller (1979) analyzed the effects of gender, race, and education on work and friendship ties. They found that increased demographic similarity affected frequency of communication. Race and gender were positively related to number of friendship ties, and education was associated with increased work contacts. More recently, Zenger and Lawrence (1989) found age and tenure similarity to be positively associated with the frequency of technical communication in project teams. O'Reilly, Caldwell, and Barnett (1989) found that increased distance in tenure within work groups lowered social integration, which was in turn associated with higher turnover.

Thus, conceptually it appears that relational demography can affect work perceptions and attitudes through both interpersonal attraction and the frequency of interactions. These effects are postulated to account for variance above and beyond that accounted for by simple demographics. Although seldom investigated in organizational settings, the effects of relational demography have been documented in marriage practices (Guttentag & Secord, 1983), public attitudes (Glenn, 1969), crime rates (Maxim, 1985), and mobility patterns (Stewman & Konda, 1983). With the exception of research on vertical dyad linkage (Graen, 1976; Liden & Graen, 1980), scholars have paid little attention to relational demography at the dyadic level. Furthermore, although there exists substantial research evidence demonstrating the importance of individual-level demographic variables such as age (Giniger, Dispenzieri, & Eisenberg, 1983; Waldman & Avolio, 1986), tenure (Gordon & Fitzgibbons, 1982; Mitchel, 1981), race (Kraiger & Ford, 1985; Moch, 1980), gender (Terborg, 1977; Tsui & Gutek, 1984), and education (O'Reilly, Parlette, & Bloom, 1980), researchers have typically not investigated how variations in multiple demographic variables, in either their simple or relational forms, affect outcomes like attitudes or work performance. Most demography studies tend to focus on age or date of entry as the primary demographic variable affecting turnover. However, social comparison processes are clearly not limited to age alone. Individuals vary on multiple demographic characteristics. Analyses of demographic effects must consider the full impact of an individual's demographic profile rather than only one

or two demographic characteristics. As Landy and Farr (1983) observed, research on rater and ratee characteristics has usually examined either one characteristic—often age—or two characteristics (usually race and gender). Those authors considered findings in this stream of research to be piecemeal and equivocal and appealed for more research examining “constellations of variables that seem likely to influence performance judgments” (Huber, Neale, & Northcraft, 1987: 154). The current study investigated the simultaneous impact of six demographic variables.

Relational Demography in Superior-Subordinate Dyads

Of outcomes that may be functions of demographic characteristics in superior-subordinate dyads, performance judgment has been the most frequently studied (Kraiger & Ford, 1985; Mobley, 1982; Pulakos & Wexley, 1983). Consistent with the similarity-attraction paradigm, affect or liking would also be a natural outcome of similarity in demographic backgrounds between members of a dyad. Less studied but potentially important outcomes that relational demography in superior-subordinate dyads may affect are the role ambiguity and role conflict experienced by subordinates. If dissimilarity in demographic characteristics leads to low communication between the members of a dyad, role ambiguity should also be high. If dissimilarity in demographic background leads to differences in attitudes, values, and beliefs, role conflict should also be high because the dyad members may have different conceptions of the subordinate's role requirements. Though the effects of demographic differences on role ambiguity and conflict may be observed with referents other than an organizational superior, we suspect the effects will be most salient in superior-subordinate dyads because superiors are the primary referent for defining performance expectations and standards for subordinates. Other outcomes may be important for other referent group members. For example, liking may be a meaningful outcome for a peer-peer dyad. This study focused on superior-subordinate dyads and examined the effect of relational demography on four outcomes: (1) the performance of the subordinates as rated by the superiors, (2) the superiors' liking for the subordinates, (3) role ambiguity as experienced by the subordinates, and (4) role conflict as experienced by the subordinates.

A general hypothesis and four corollaries were explored. The general hypothesis concentrates on the overall effects of the multiple demographic variables on each of the four outcome measures. We developed the four corollary hypotheses to specify the relationship of each relational demographic variable to the outcome measures.

Hypothesis 1: The greater the dissimilarity in demographic background between a superior and a subordinate, the more negative will be such job outcomes as performance, affect expressed by the superior toward the subordinate, and role ambiguity and conflict as experienced by the subordinate.

This is a directional hypothesis in that we expected differences in the rela-

tional demographic variables to be associated with unfavorable performance and affect ratings and with high role ambiguity and conflict scores. We further specified the expected effects of each relational demographic variable on the outcomes as follows:

Hypothesis 1a: Differences in race and gender in a superior-subordinate dyad will be negatively associated with both the superior's performance ratings of the subordinate and affect toward the subordinate.

Research evidence to date has shown consistent though weak support for same-race (Kraiger & Ford, 1985) and same-gender (Mobley, 1982) bias on performance ratings, in that ratees were generally rated more favorably by raters of the same race or same gender. On the basis of the similarity-attraction paradigm, we expected to observe the effect of these two relational demographic variables to be larger on a superior's affective feeling toward a subordinate than on the performance rating. This expectation is also consistent with a finding of Lincoln and Miller's (1979). In their study, race and gender were related to number of friendship ties but not to work contacts.

Hypothesis 1b: Differences in age in a superior-subordinate dyad will be positively associated with the role ambiguity experienced by the subordinate and negatively associated with the superior's performance ratings of the subordinate.

This hypothesis is derived in part from the decremental theory of aging (Giniger et al., 1983) and in part from recent research on age similarity and frequency of technical communications (Zenger & Lawrence, 1989). To the extent that a large difference in age reduces task-oriented communication, subordinates will have less clarity in performance goals and performance strategies. Whether true performance or bias is responsible, we expected superiors, especially younger superiors, to give lower performance ratings to subordinates older than themselves.

Hypothesis 1c: Differences in education in a superior-subordinate dyad will be positively associated with the role ambiguity and role conflict experienced by the subordinate and negatively associated with the superior's affect toward the subordinate.

When members of a dyad differ on educational level, they also tend to vary on beliefs and values and may communicate relatively infrequently, since they do not have the "language compatibility" (March & Simon, 1958: 167) that is associated with similar levels of educational attainment. Thus, the superior and the subordinate may come to have different conceptions of the subordinate's job requirements, resulting in higher role ambiguity and role conflict for the subordinate. Such a difference in job expectations, coupled with the prestige associated with education (at least as perceived by the subordinate), may widen both the cognitive and the emotional distance between the superior and the subordinate.

Hypothesis 1d: Differences in job tenure between mem-

bers of a superior-subordinate dyad will be positively associated with the role ambiguity experienced by the subordinate.

The amount of time each member of a dyad has held their job may influence role ambiguity. A new subordinate is likely to experience a higher level of role ambiguity than an experienced subordinate. Obversely, a subordinate who has been in a job for some time but who gets a new superior may also experience some role ambiguity. Clearly, role ambiguity should be highest when both members are new in their jobs. We postulated that differences in job tenure would have a significant incremental effect on role ambiguity, even after the length of tenure of each member of the dyad was controlled for.

Finally, we included company tenure in our analysis because it is an important variable for predicting turnover and an integral variable for describing the demographic profile of any organizational member. We considered job tenure to be more meaningful than company tenure in predicting these specific outcomes at the level of superior-subordinate dyads.

METHODS

Sample

The sample was a group of middle managers and their superiors. The population was 3,000 middle-level managers in a Fortune 500 multidivisional corporation. These managers occupied positions ranging from that of section manager to that of vice president. In order to obtain enough managers who were women or members of minorities to test the gender and race effects, we increased the sampling ratio of those two variables. Therefore, the initial random sample included 10 percent of the white men, 50 percent of the white women, and 50 percent of the minority managers in the corporation. This process yielded 558 managers. A total of 344 managers actually participated in the study, representing a response rate of 61.6 percent. We also obtained the participation of 272 superiors of these 344 managers. Thus, the effective response rate for this study was 49 percent.

The representativeness of this sample was verified by comparing the average age, education level, company tenure, and official performance ratings of the 344 managers with the average values of these variables for the middle-management population in the company. Analysis showed that the profile of the 344 managers based on these four variables was highly similar to that of the firm's middle management population. Thus, the sample of managers for this study appeared to be representative, with the exception of race and gender, of this company's middle managers.

Following Dansereau, Alutto, and Yammarino (1984), we studied dyads composed of a superior and a subordinate. Data were obtained from each manager and his or her superior (Graen, 1976). Thus, the analysis was explicitly at the level of superior-subordinate dyads, not superior-subordinate groups, although we assessed the dependent variables at the individual

level. A total of 272 superior-subordinate dyads were available. To check for representativeness, we compared this sample to the group of 72 managers for whom data on superiors were not available. Comparisons were made on three demographic variables—the managers' age, company tenure, and education—and on the official performance ratings the superiors had given the managers. No significant differences were found on any of these variables.

Procedures

Potential respondents were introduced to the research by a letter from the corporation's vice president for personnel. Within a week of their receiving this letter, we sent a package of survey instruments to each manager. We asked the subordinate managers to complete a survey and to give a different survey to their superiors for completion. The managers were told that the research sought to identify superiors' role expectations for their subordinate managers and the factors associated with managerial success. Both the subordinate managers and their superiors returned the completed surveys directly to us via a self-addressed, stamped envelope. Thus, though the subordinates saw the content of the superiors' survey, they did not see their superior's actual responses. The two surveys also contained questions on managerial roles and activities that were part of a larger study on managerial effectiveness.

Measures

Independent variables. Measures on the six demographic variables (age, gender, education, race, company tenure, and job tenure) were taken on both the subordinates and the superiors. Age was measured in years. Gender was coded with 1 designating men and 2 designating women. Education was measured by nine levels, with larger values corresponding to higher levels of educational attainment. Race was coded with 1 designating white and 2 designating nonwhite. A review of the research literature on race effects revealed that almost all of them have focused on black-white differences; nine of ten race studies we reviewed analyzed black workers, and one focused on Chicanos in New Mexico. This trend among previous studies suggested that analyses of race effects should avoid mixed racial groups, so for clearer interpretation of any potential race effect that might be observed in this study, we decided to exclude the race variable of minority-group subordinates who were not black. There were 49 nonwhite subordinates, of whom 20 were Asian or Spanish surnamed rather than black. We included these 20 subordinates in the analyses of the other five demographic variables. There were 10 black superiors and no superior who was a nonblack minority member.

The relational demographic scores were created by squaring the difference between the values for the demographic variables of the subordinates and their superiors. This distance measure is a dyadic analog to the *D*-score previous research has used to measure demographic distance in groups

(Wagner et al., 1984).¹ The squared term is used to derive an absolute difference score and to postulate an exponential function between the distance score and the outcome variable (Winkler & Hays, 1975). We obtained continuous difference scores on age, education, job tenure, and company tenure. For example, a difference score of 0 on the age variable meant that a subordinate and a superior were identical in age. A difference score of 1 meant that they differed by one year, and a difference of 4 meant that they differed by two years (in either direction). We obtained dichotomous difference scores on the gender and race variables, with 0 indicating that the subordinate and superior were of the same race or gender and 1 indicating that they were of different races or genders.

Dependent variables. Four outcome variables were measured. Two were obtained from the superiors' surveys: the performance effectiveness of a subordinate according to his or her superior's private opinion, and the superior's liking for the subordinate. We hereafter refer to these two variables as reputational effectiveness and supervisory affect, respectively. Reputational effectiveness is a three-item scale (Tsui, 1984) with high internal consistency ($\alpha = .90$) measuring the extent to which a subordinate had met the expectations of a superior in terms of roles and responsibilities.

Supervisory affect is also a three-item scale (Tsui & Gutek, 1984) with acceptable internal consistency ($\alpha = .69$). It was adopted from the interpersonal affect measure used by Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964), which measures the degree to which a rater likes a ratee, with high scores connoting a high degree of liking. The components of liking in this measure include enjoying working with a ratee, respecting the ratee's judgment, and believing that the ratee will extend help whenever the rater asks.

Rizzo, House, and Lirtzman (1970) developed the eight-item role conflict and six-item role ambiguity measures we used; Schuler, Aldag, and Brief (1977) subsequently revalidated them. We took the wording for the 14 items directly from the latter. The subordinates completed the role conflict ($\alpha = .85$) and role ambiguity ($\alpha = .84$) items.

Control variable. In order to examine the impact of demography on superiors' private evaluations of subordinates' effectiveness, independent of the subordinates' official performance level, we used the most recent official performance rating as a control variable. In the corporation studied, this

¹ Wagner, Pfeffer, and O'Reilly (1984: 80–81) defined the distance measure as a measure of isolation. It is an individual-level variable that transforms a demographic variable, such as a birth date or date of entry to the firm, into a metric that captures degree of membership in a cohort. One way to define this metric is the distance between any two individuals in terms of the Euclidian distance between each of them and every other person in the population of interest. A high score represents a weak connection to the group. This measure is a network analogue for representing social similarity. We have adopted this distance (*D*) score to measure social similarity in a two-person group, or a dyad. It is therefore directly analogous to the distance score that Wagner and colleagues employed to index an individual's similarity to all other individuals in a group.

rating is a one-item, 9-point scale, and is a summary measure of overall performance in achieving results-oriented objectives and effectiveness on 12 behavioral dimensions.

For this study's performance measure, we chose to use reputational effectiveness, the rating superiors made for this research, instead of the official rating for several reasons. First, the research rating is a three-item scale with high internal consistency reliability, and the reliability of the single-item official rating is unknown. Second, the research rating has proportionally larger variance than the official rating; the former has a standard deviation of 1.07 on a 7-point scale, and the latter, 1.15 on a 9-point scale. The coefficient of variation ($s.d./x$) for the research rating is 22 percent greater than the coefficient of variation for the official rating. Previous research (Wherry & Bartlett, 1982) has demonstrated that private performance ratings obtained for research purposes have better validity and reliability than official performance ratings obtained for administrative purposes. An assumption in our analysis was that factors other than ratee performance may bias official ratings. The residual from the partialing procedure used measured a supervisor's private opinion about a subordinate's performance, independent of the official rating. The private rating is a more meaningful measure for the assessment of demographic effects. Since nonperformance factors may also contaminate private ratings, we deliberately refer to the variable used as reputation or reputational effectiveness rather than as performance.

Analysis

Multiple regression analysis was used to estimate the effects of the demographic variables on the four outcome measures. Independent variables include superiors' and subordinates' simple demographic attributes and their relational forms (the squared differences between a subordinate's and superior's demographic measures). We developed separate regression models for each of the four outcome variables. The model for reputational effectiveness and for supervisory affect also included, as a control variable, the subordinate's most recent official performance rating.

Unique variance contributed to the outcome measures by each of the three sets of demographic variables and by the official performance rating was estimated by blocked regressions (Cohen & Cohen, 1975). This procedure controls for intercorrelations among independent variables by partialing out shared variance and measuring the unique contribution of the block of variables entered into the regression after all other independent variables have been entered. If inclusion of a block of independent variables significantly increases the overall amount of variance explained, that block of variables is deemed to have made an independent contribution to the variance explained in the dependent measure beyond that explained in earlier blocks. Since we were interested in the independent contribution of the set of relational demographic variables to variance in the four outcome measures, after controlling for the effects of simple demographic characteristics

of both the superiors and the subordinates, we considered this procedure appropriate. Other researchers have used it for similar purposes (e.g., Huber et al., 1987). We used this blocked regression procedure to estimate the unique contribution made by each set of demographic variables (the subordinates' demographics, the superiors' demographics, and the relational demographics) on each of the four outcome measures, controlling for the effects of the other two sets of demographic variables.

Since a specific direction in effect was predicted for the relational demographic variables, we used one-tailed tests of significance for these variables. Two-tailed significance tests were used for all simple demographic variables. Negative signs on the regression weights associated with the relational demography variables for supervisory affect and reputational effectiveness and positive signs on the regression weights associated with role ambiguity and role conflict would indicate results consistent with the hypotheses.

Additional analyses were performed to further explore the specific nature of the effects for relational demographic variables with significant regression weights on the outcome measures and especially for unexpected findings. For example, we performed two-way ANOVAs on the significant relational race and gender effects. One-way ANOVAs were performed on the continuous measures by trichotomizing the sample into three groups. If age difference was significant, for instance, we compared the mean ratings on the outcome variable for subordinates who were younger, the same age, and older than their superiors to isolate the specific nature of the differences. The ANOVA analyses on the reputational effectiveness and affect variables were performed with the official rating as a covariate. Finally, we conducted special analyses to check for any multicollinearity problem among the independent variables, using procedures described by Green (1978: 226–228).

RESULTS

Table 1 summarizes the descriptive statistics for the demographic variables. In general, compared to the subordinates, the superiors were slightly older, and they were predominantly men (94%). Three percent of the superiors were black. Superiors had slightly higher educational levels and longer company and job tenures. Table 1 also shows proportions of dyads with identical and different demographic measures.

Table 2 presents the intercorrelations among all the variables. The official performance rating is correlated with both reputational effectiveness and affect rating but not with the two role stress variables. The correlation between the official rating and the reputational effectiveness rating is only .46, showing a divergence between public and private opinions and providing some support for the argument that the two measures are not redundant. The correlation between reputational effectiveness and affect is .70, suggesting that supervisors' private judgments of subordinates' effectiveness are associated with their affect toward the subordinates (Latham & Wexley,

TABLE 1
Sample Demographics^a

Demographic Variables	Subordinates	Superiors	Relational Demographics	
			Same	Different
Mean age in years	41.5 (8.2)	44.1 (7.5)	14 (5%)	256 (95%)
Gender				
Men	256 (74%)	261 (96%)	197 (73%)	74 (27%)
Women	88 (26%)	10 (4%)		
Race				
White	295 (91%)	258 (97%)	233 (92%)	20 (8%)
Black	29 (9%)	7 (3%)		
Education				
Less than high school	23 (7%)	8 (3%)	61 (23%)	210 (77%)
High school	33 (10%)	11 (4%)		
Some college	20 (6%)	10 (4%)		
Technical degree	44 (13%)	34 (12%)		
Bachelor's degree	110 (32%)	94 (35%)		
Some graduate courses	49 (14%)	55 (20%)		
Master's degree	56 (16%)	52 (19%)		
Postmaster courses	2 (1%)	4 (2%)		
Doctoral degree	6 (2%)	4 (2%)		
Mean job tenure in years	2.9 (2.9)	3.6 (4.1)	62 (25%)	182 (75%)
Mean company tenure in years	10.3 (6.5)	13.0 (7.3)	31 (12%)	234 (88%)

^a There were 344 subordinates and 272 superiors studied. Some values do not add to 344 or 272 because of missing data. Standard deviations are reported in parentheses for the mean values of measures. Except for the means and percentages in parentheses, values reported are *N*'s.

1979; Tsui & Barry, 1986). Though these two measures are empirically correlated, we do not know whether they are conceptually redundant. For the purpose of this study, we decided to treat them as separate since we had postulated that some demographic variables would be differentially related to the two measures.

The intercorrelations among the six demographic variables for each member of the dyad were next examined. In most cases, the variables are not correlated. The largest correlation is between age and job tenure, for both the subordinates ($r = .42$) and the superiors ($r = .45$). The intercorrelations among the six relational demographic variables are also extremely small and largely nonsignificant. The correlations between the subordinates' and the superiors' simple demographic variables are also either nonsignificant or very small. Next, we examined the correlations between the simple demographic variables and their relational forms. Most of the correlations are small (med. = $-.01$); only 3 of the 72 correlations (12 simple \times 6 relational demographic variables) are greater than .70. Using Green's procedures (1978:

TABLE 2
Intercorrelations^a

	Dependent and Control Variables					Subordinates' Demographics							Superiors' Demographics							Relational Demographic Variables				
	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Superiors' ratings																								
1. Reputational effectiveness	5.03	1.07																						
2. Affect for subordinate	4.13	0.59	70																					
Subordinates' ratings																								
3. Role ambiguity	3.20	1.06	-24	-15																				
4. Role conflict	3.99	1.09	-14	-11	46																			
Control variable																								
5. Official performance rating	6.80	1.15	46	32	-07	02																		
Subordinates' demographics																								
6. Age	41.54	8.21	-06	-00	-18	-17	-04																	
7. Gender	1.26	0.44	09	03	-01	-15	01	-27																
8. Race	1.09	0.29	-20	-21	07	00	-12	-08	-02															
9. Education	4.76	1.84	-01	-06	11	16	10	-09	-10	06														
10. Job tenure	2.88	2.85	07	10	-16	-06	02	42	-21	-00	-05													
11. Company tenure	10.29	6.52	04	12	-10	-15	-03	29	-12	-14	-26	13												
Superiors' demographics																								
12. Age	44.13	7.45	06	19	-15	-20	01	29	03	-06	-10	24	22											
13. Gender	1.04	0.19	14	09	04	-02	-02	03	10	09	05	-08	-04	-10										
14. Race	1.03	0.16	-04	-04	-00	01	-03	-08	06	30	03	-10	-09	-06	09									
15. Education	5.25	1.55	04	06	-03	03	04	01	02	13	32	-03	-09	-15	02	03								
16. Job tenure	3.61	4.09	02	09	-16	-20	01	24	10	01	-05	26	04	45	02	-09	-04							
17. Company tenure	13.00	7.32	-01	05	-06	-08	-09	12	-07	-10	-12	03	36	35	-17	-11	-17	21						
Relational demographic variables																								
18. Age	92.84	165.43	-02	-02	06	-04	-02	-14	22	-04	05	-01	-15	34	01	02	-10	12	-00					
19. Gender	0.27	0.45	05	-01	05	-08	06	-28	81	-03	-07	-20	-10	01	10	00	-05	07	-06	27				
20. Race	0.08	0.27	-17	-14	-00	-05	-12	-08	01	82	02	03	-12	-06	02	22	05	01	-07	-00	05			
21. Education	4.25	6.08	-02	-11	-15	-11	-06	16	05	-05	-35	06	16	07	-00	-07	-05	00	07	05	07	-05		
22. Job tenure	19.93	62.03	-01	-02	-03	-18	01	28	14	-04	-14	24	07	35	11	-05	-11	76	20	06	07	-03	-03	
23. Company tenure	68.92	128.52	00	-01	-02	-07	-07	07	-05	-00	03	09	-09	27	-08	-07	-09	11	37	16	-04	-00	-04	19

^a Decimals have been omitted. Correlations of .19 or greater are significant at $p < .05$ or lower.

226–228), we did not find a multicollinearity problem. Further, blocked regression is intended to handle the multicollinearity problem among independent variables. In the regression analysis, we deleted one of the two variables with a high intercorrelation—subordinates' gender and the difference score on gender—and the magnitude of the overall model decreased. Still further, both of the two correlated variables have significant *t*-values on their regression coefficients, suggesting that they are both contributing unique variance to the dependent measure. All in all, multicollinearity does not appear to pose a threat to the validity of the results.

Table 3 presents the regression results. The results of all four regression equations were significant, suggesting the importance of demographic variables in predicting reputational effectiveness, liking, and role perceptions. We first discuss the results for the relational demographics that pertain to the hypotheses. Then, we report additional insights obtained from the results for the simple demographic variables.

Overall, the relational demographics contributed significantly to three of the four outcome measures, with 13 significant coefficients out of 24 possible. Five of the six relational demographic variables have significant regression weights on one or more of the four outcome measures. The only nonsignificant variable is company tenure. Interestingly, this was the only demographic variable for which we did not postulate any relationship to the outcome measures. These results support the general hypothesis that demographic differences between a subordinate and a superior may have significant effects on outcomes such as performance evaluation, supervisory affect, and the role perceptions of the subordinate. After we had controlled for the simple demographics and for the recent official performance rating, the six relational demographic variables accounted for 8 percent of the variance in role ambiguity, 6 percent of the variance in supervisory affect, 4 percent of the variance in the reputational effectiveness rating, and 3 percent of the variance in role conflict.

In interpreting the results for Hypotheses 1a through 1d, we focused on the block of relational demographic variables. We shall discuss each corollary hypothesis in turn. Thus, reading the results in Table 3 across rather than down the columns will facilitate understanding.

Hypothesis 1a related differences in race and gender to the performance effectiveness and supervisory affect variables. The results shown in Table 3 support the hypothesis regarding gender differences. The subordinates in mixed-gender dyads were rated as performing more poorly and were liked less well than the subordinates in same-gender dyads. Furthermore, subordinates in mixed-gender dyads also reported higher levels of role ambiguity and role conflict. Additional analyses suggest that woman subordinates with woman superiors reported the lowest level of role ambiguity, were rated to be most effective, and were liked most by their superiors. Men with women as superiors reported the highest level of role ambiguity. Men and women with men as superiors showed little difference on all the outcome measures.

On the other hand, we found no support for a race difference effect.

TABLE 3
Results of Regression Analysis of Relational Demographics
on Outcome Variables

Demographic Variables	Outcome Variables ^a			
	Reputational Effectiveness	Supervisory Affect	Role Ambiguity	Role Conflict
Control variable				
Official performance rating	.46**	.31**		
Change in R ²	.20**	.09**		
Subordinates' demographics				
Age	-.13†	-.12†	-.08	-.13
Gender	.43**	.27†	-.40**	-.45**
Race	-.24*	-.34**	.27*	.12
Education	-.06	-.14*	.06	.07
Job tenure	.13*	.12†	-.10	.04
Company tenure	.05	.08	-.04	-.12
Change in R ²	.07**	.09**	.07**	.06*
Superiors' demographics				
Age	.06	.21**	-.07	-.07
Gender	.19**	.18**	-.02	-.02
Race	.01	.02	-.06	.00
Education	.04	.12†	-.04	.01
Job tenure	.10	.16	-.34**	-.17
Company tenure	.02	-.02	.03	.05
Change in R ²	.04†	.08**	.06*	.02
Relational demographics				
Age	-.05	-.07	.10†	-.00
Gender	-.38**	-.28*	.37**	.32*
Race	.08	.17†	-.22*	-.18†
Education	-.01	-.16**	-.11†	-.05
Job tenure	-.19*	-.24**	.33**	.06
Company tenure	.07	-.01	-.07	-.08
Change in R ²	.04*	.06**	.08**	.03
Overall R ²	.32	.27	.16	.14
Adjusted R ²	(.26)	(.21)	(.09)	(.07)
Overall F	5.15**	4.10**	2.22**	1.89*
df	19,207	19,207	18,208	18,208

^a Entries are standardized regression coefficients. We used one-tailed tests for partial regression coefficients on the relational demographic variables and two-tailed tests on all the simple demographic variables.

† $p < .10$

* $p < .05$

** $p < .01$

Subordinates in mixed-race dyads were not rated differently from subordinates in same-race dyads on effectiveness. Further, the positive regression sign suggests that subordinates in mixed-race dyads were liked slightly more than subordinates in same-race dyads ($p < .10$). Additional analyses revealed that white subordinates received the highest affect ratings from black superiors and black subordinates received the lowest affect ratings from the

black superiors. A nonhypothesized association between race differences and role ambiguity and role conflict also emerged. However, the direction of the relationship was again counterintuitive. Further analyses, however, indicated that white subordinates with black superiors reported the highest level of role ambiguity and role conflict. Black subordinates reporting to white superiors, on the other hand, reported the lowest level of role ambiguity. These findings clearly extend our current knowledge about race effects (Kraiger & Ford, 1985).

The relationship of age differences in a dyad to the role ambiguity experienced by the subordinates (Hypothesis 1b) was marginally supported. Subordinates in dyads with larger differences in age reported higher levels of role ambiguity ($p < .10$). Additional analyses revealed that subordinates who were either younger or older than their superiors reported more role ambiguity than subordinates of the same age. Age differences, contrary to the hypothesis, were not related to the effectiveness ratings made by the superiors. Thus, Hypothesis 1b was only partially supported.

Partial support also emerged for Hypothesis 1c. Educational differences in the dyads were negatively associated with the supervisors' liking of the subordinates, consistent with the hypothesis. However, this relational measure is also negatively associated with subordinates' role ambiguity, contrary to the hypothesis. Additional analyses indicated that subordinates with less education than their superiors were liked better, but those subordinates also reported lower role ambiguity than subordinates who had the same or more education than their superiors. There was no systematic association between educational differences and subordinate role conflict.

Hypothesis 1d specified that differences in job tenure would be positively associated with increased role ambiguity as experienced by the subordinates. Results supported that relationship. In addition, differences in job tenure were also negatively associated with both effectiveness and supervisory affect ratings. Additional analyses suggested that superiors saw subordinates with either more or less time in their current job than the superiors had as less effective performers than subordinates with job tenure equivalent to their superiors'. However, superiors liked subordinates with shorter job tenure than themselves better than they liked subordinates with either the same or longer job tenure. In addition, the subordinates with shorter job tenure reported the highest level of role ambiguity. Subordinates with longer job tenure than their superiors reported the lowest level of role ambiguity. These results provide full support for Hypothesis 1d.

In summary, the results on the relational demography variables are generally consistent with the hypotheses. We hypothesized that differences in gender and race would have a negative relationship with supervisory affect and with effectiveness ratings (Hypothesis 1a) and observed a significant effect on affect and role ambiguity. We postulated that differences in age would be related to role ambiguity and to a subordinate's effectiveness as rated by a superior (Hypothesis 1b). The former was supported but the latter was not. Hypothesis 1c, concerning differences in educational level, re-

ceived general support. The predicted association between role ambiguity and affect was observed, but educational differences had no relationship with role conflict. Difference in job tenure was related not only to role ambiguity, as expected (Hypothesis 1d), but also to superiors' effectiveness and affect ratings. Finally, as we suspected, company tenure had no relationship to any of the outcome variables. In summary, we found support for seven of the ten predicted effects. Further we found several unpredicted effects that were consistent with the general hypothesis. This further strengthens the basic thesis of this study, that relational demography will have effects on job outcomes above and beyond the effects of simple demographics.

Though we were not specifically interested in the simple demographic variables other than as controls, several interesting findings emerged that merit some discussion. For example, subordinates' demographic attributes contributed significantly to all four outcome measures. Superiors rated older subordinates as less effective and liked them less than younger subordinates. Women received higher effectiveness ratings, were liked more, and reported lower levels of role ambiguity and role conflict. Black subordinates were rated lower in effectiveness, were liked less well, and reported a higher level of role ambiguity than did white subordinates. Superiors liked subordinates with more education than themselves less than they liked subordinates with less education. Subordinates with long job tenure were rated as more effective and liked better than subordinates with short job tenure. Results for the superiors' demographics suggest that older superiors expressed more positive affect toward their subordinates than did younger superiors. Women gave higher effectiveness and affect ratings. Finally, a high level of role ambiguity was reported by subordinates whose superiors had short job tenure. Most, though not all, of these simple demographic effects corroborated and extended existing research on employee characteristics. Further, these results were net of the influence of the demographic attributes of the other member of each dyad and of the demographic differences between them.

DISCUSSION AND SUMMARY

This study demonstrated the importance of relational demography for understanding employee job outcomes. We observed relational demographic effects even after controlling for the influence of the simple demographic characteristics of both the subordinates and superiors in the dyads studied. Results show particularly strong effects in mixed-gender dyads and dyads of people with different job tenures. The gender effect corroborated current research results on gender. Favorable outcomes were observed for woman subordinates with woman superiors. However, this finding does not totally support the same-gender bias effect (Mobley, 1982), since men did not rate subordinates who were men more favorably than they rated subordinates who were women. Results on tenure differences in the dyads also provided insight that is not evident from existing research (Giniger et al., 1983;

Mitchel, 1981). Subordinates with shorter job tenure than their superiors received the most favorable affect ratings of all subordinates. One possible explanation for this phenomenon may be that the superiors had recently promoted or selected these subordinates, which would lead to the subordinates having a shorter job tenure than the superiors. Employment selection research has consistently found a tendency for people to hire someone who is similar to themselves with respect to attitudinal or demographic dimensions (Arvey & Campion, 1982). Thus, this favorable affect rating may reflect both justification of a selection decision and attraction due to similarity on other demographic dimensions.

The results for role ambiguity and job tenure are also interesting. Subordinates' job tenure itself was unrelated to role ambiguity. However, high role ambiguity was associated with superiors' short job tenure. Further, the effects of differences in job tenures were not the same for subordinates with longer job tenure than their superiors and for those with shorter job tenure. As we expected, subordinates with longer job tenure than their superiors reported a lower level of role ambiguity than subordinates with either the same or shorter tenure. Differential job experiences in a dyad may lead to communication problems (Roberts & O'Reilly, 1979), consequently affecting the level of role ambiguity experienced by the subordinate.

The different results for job and company tenure suggest the importance of both the conceptual and operational clarity of the tenure concept. This research indicates that job tenure is a more important and relevant construct than company tenure for analyzing the relationship in a subordinate-superior dyad (McCain et al., 1983).

The results for age differences clearly extend earlier research findings. Waldman and Avolio (1986) concluded from their meta-analysis that older workers were consistently rated lower than younger workers. In our study, superiors not only rated older workers as performing less well, but also liked them less well than younger workers. However, we could not tell from this study if the lower effectiveness ratings for older subordinates reflected actual performance or simply a bias. It is also interesting to discover that subordinates who were either younger or older than their superiors reported a higher level of role ambiguity than subordinates who were the same age as their superiors. Although this effect is weak, it is interesting to note the additional information provided by examining comparative age.

The findings on race also extend the results of earlier studies that have found a significant, albeit small, same-race bias in performance ratings (Kraiger & Ford, 1985). The results of this research suggest a possible reason for lower ratings in mixed-race dyads. Subordinates in mixed-race dyads, especially white subordinates with black superiors, reported role ambiguity and conflict, often deterrents to performance. Communication and status incongruence problems in mixed-race dyads may explain these findings.

Finally, the results for educational differences provided further insight into the importance of this demographic variable. Neither the education of

each member of a dyad nor educational differences between them had any effect on the effectiveness and role conflict ratings. We observed effects, however, on supervisory affect and role ambiguity. These findings suggest a potential negative dynamic in superior-subordinate dyads in which the superior has the same or less education than the subordinate.

Although the overall relational demography hypothesis was supported, additional analyses showed the effect may be positive rather than negative in some special cases. For instance, we noticed that job outcomes seemed favorable for subordinates who, compared to their superiors, were younger, had less education, and less job tenure. In these dyads, the superiors may have been more secure and confident in their roles, suggesting that relational demography may be important not only for indexing social distance or similarity in goals and values associated with understanding and acceptance, but also for indexing the psychological comfort of superiors, including feelings of confidence and power.

This study, with some limitations, makes several contributions to the demography literature. It extends the concept of demography to the dyadic level, whereas the extant research on demography has tended to focus at either the organizational level, representing the sociological tradition, or the individual level, representing the industrial-organizational psychology tradition. The concept of relational demography captures the dynamic interactions associated with demographic differences in dyads. It has the potential to be extended to analyzing demographic effects in coacting or interacting small groups.

This study also argued for and demonstrated the importance of examining multiple demographic variables, since people are represented by a demographic profile rather than by one or two demographic variables. The results show that a constellation of demographic variables explain an amount of variance larger than what has been shown in existing literature on similar variables. These variables have traditionally accounted for less than 5 percent of the variance in outcome measures (Cleveland & Landy, 1981; Mobley, 1982). The sample in this study was of a reasonable size, so the results are unlikely to be an artifact of a small variable-to-sample ratio.

Our argument has been that the study of relational demographic variables offers insights above and beyond those provided by analysis of simple or direct demographic variables. The results of this study indeed show that considering relational demography can lead to significant incremental contribution. By including both the simple demographic variables and their relational forms, we more than doubled the amount of variance explained, suggesting the importance of considering the compositional effects or non-linear impacts of these variables. This research suggests the importance of examining the full impact of demographic variables. However, though the relational measures explain variance above and beyond simple direct effects, the incremental contribution is relatively small, especially on the two role measures. The small amount of variance explained, however, should not

deflate the importance of the demographic variables because role ambiguity and role conflict are clearly affected by many other nondemographic factors in job settings (Jackson & Schuler, 1985).

Importantly, the demographic predictions made here were consistent with taking the similarity-attraction paradigm as a basic theoretical foundation. We postulated that demographic similarity would be associated with attitudinal and value similarity, which may enhance interpersonal attraction and increased frequency of communication. Communication can in turn reduce role ambiguity. The study showed direct links between demographic similarity and interpersonal attraction, although it only measured superiors' attraction to subordinates. We did not directly assess attitudinal or value similarity or frequency of communication as intermediary processes. Although there is research linking relational demography and communication (e.g., Zenger & Lawrence, 1989), more fine-grained examinations of the attitudinal and cognitive processes that link demographic similarity to job outcomes are desired. In conclusion, this study has suggested other avenues for future research on relational demography and job outcomes.

What advice might we give managers based on this research? Pfeffer (1985) outlined several managerial implications of demographic effects at the group and organizational levels. Similar concerns and advice might also be appropriate at the dyad level. For example, five of the six relational variables affected role ambiguity. Those effects might indicate potentially important situations that superiors should not ignore. Superiors might want, for instance, to increase communication when they differ in demographic background from subordinates, especially on multiple demographic measures. At least four of the six relational demographic variables affected superiors' liking for subordinates. To the extent that a superior's liking a subordinate is desirable, offering the latter either psychological or instrumental value, individuals might want to attend to the demographic profile of potential superiors in selecting or accepting job assignments, transfers, and job offers. By becoming aware that demographic similarities could result in liking a subordinate, superiors might exercise caution to prevent such liking from biasing other judgment or employment decisions.

Clearly, this research does not suggest, nor do we advocate, that it is best for organizations to hire people who most clearly match the demographics of current managers. If an organization has white men as managers, should it simply hire more white men? This is a managerial decision involving a value stance as well as legal implications. This research simply reports the potential outcomes of discrepancies in demographic profiles. Managerial discretion and pragmatism are always needed in applying research results.

Although the amount of variance relational demography accounted for is small, the study clearly suggests that demography at the dyadic level can and should be examined beyond the simple one- or two-variable analysis that characterizes much of the literature. Relational demography has the potential to capture the impact of demographic effects more fully and also

offers a bridge between the individual and the organizational levels of analysis.

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Anne S. Tsui, an assistant professor of organizational behavior in the Graduate School of Management, University of California, Irvine, received her Ph.D. degree from the University of California, Los Angeles. Her current research interests include the study of managerial reputational effectiveness, effectiveness of the human resource management function in complex organizations, and analysis of demographic effects on work outcomes.

Charles A. O'Reilly III is a professor of organizational behavior in the School of Business Administration, University of California, Berkeley, where he also received his Ph.D. degree. His current research interests include studies of CEO compensation, person-job fit, and organizational demography.

ABSENTEEISM AMONG HOSPITAL NURSES: AN IDIOGRAPHIC-LONGITUDINAL ANALYSIS

RICK D. HACKETT
McMaster University

PETER BYCIO
Xavier University

ROBERT M. GUION
Bowling Green State University

For several months, nurses completed ratings of the degree to which certain events relevant to absence were present during each of their scheduled workdays. The event ratings for days when the nurses decided to be absent were then compared with those for days when the nurses attended. As expected, certain events, such as ill health and tiredness, tended to covary and proved to be consistently related to absenteeism across nurses. Also as expected, some events that were not especially relevant for the nurses as a whole, like having a sick family member or friend and concerns about previous poor attendance, nonetheless emerged as being relevant to the absence behavior of certain individuals. Finally, some events were consistently related to the nurses' expressed desire to be absent but not to actual absences. We discuss these differences from two perspectives, one emphasizing the role of attribution bias and the other, a two-stage process in which such bias has no major role.

Although little theory-guided research on employee absenteeism has been conducted, Nicholson (1977) identified three related theoretical approaches that attempt to advance understanding of the phenomenon. The following condense those approaches: (1) absence represents a flight from negatively valued aspects of work experience (March & Simon, 1958), (2) absence is an outcome of organizational socialization and other adaptive processes to job demands (Hill & Trist, 1955), and (3) absence results from a rational decision or choice process directed toward the attainment of valued

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goals (Stagner & Rosen, 1965; Vroom, 1964). The first two perspectives tend to emphasize the importance of employees' affective reaction to work environments; in contrast, this investigation focused on the third approach, which highlights the purposive, volitional aspects of absence behavior. The current study is also intended to fill some of the gaps in the existing absenteeism literature that Steers and Rhodes (1978, 1984) and Johns and Nicholson (1982) identified. Specifically, we quantitatively examined the absence behavior of individual employees in addition to that of a group of employees as a whole and evaluated the relevance of proximal events to absences by using a longitudinal design.

ABSENTEEISM AS VOLITIONAL BEHAVIOR

The core proposition of the volitional approach to absenteeism is that a worker has a *choice* whether to attend work on any given day. This is not to suggest that before starting off to work employees go through a daily ritual of consciously evaluating the pros and cons of attending, since attendance is likely to be more of a habit (Nicholson, 1977). Rather, when one or more absence-inducing events do arise, they are likely to trigger a consideration of the costs and benefits of taking the day off. For example, on awakening an employee may feel ill, the car may fail to start, the baby-sitter may be unavailable—any number of similar events might arise prompting a person to depart from habit and seriously consider missing work. From such a volitional perspective, efforts to understand absenteeism should aim to identify those factors that are likely to enter into the absence or attendance decision.

Morgan and Herman (1976) studied the volitional aspects of absenteeism among unionized employees at an auto-parts foundry. Using her experience on the plant's absenteeism study committee as a guide, the senior author generated various motivating consequences (e.g., a break from routine, personal business) and deterrents (loss of wages, co-workers having to work harder) of missing work. Employee ratings of the importance and instrumentality of those events were then correlated with absenteeism. Morgan and Herman found that frequently absent employees were more likely to view a break from routine, dealing with personal illness, and leisure time as important reasons to miss work than were regular attenders. Those with poor attendance were also more likely than others to view absenteeism as being a way to attain those valued outcomes.

Morgan and Herman's research is especially informative in two respects. First, unlike many studies in the area, it explicitly recognized the effects of extraorganizational influences on attendance. Both Johns and Nicholson (1982) and Steers and Rhodes (1984) called for more investigation of such nonwork variables. Those authors also advocated studying daily events, Johns and Nicholson explicitly and Steers and Rhodes implicitly. Thus, second, perhaps further consideration of the dynamic everyday events studied by Morgan and Herman (1976) will enhance our understanding of what, beyond the modest contribution made by employee attitudes (Hackett & Guion, 1985; Johns & Nicholson, 1982), influences employees' absences.

Individual Differences in the Importance of Absence-Relevant Events

One way to build on the work of Morgan and Herman (1976) would be to explicitly consider that individuals may differ in their susceptibility to absence-inducing events. For example, Nicholson (1977) proposed such occurrences be placed on an "A-B" continuum, where A-pole events are those that leave an individual little choice as to whether or not to attend, and B-pole events are those that leave the attendance decision entirely within the control of the person. A key point of this conceptualization is that individual differences, including the type of work a person does, would be expected to affect the position of a given event on the continuum. For example, a minor illness would likely be an event leaving little choice about attendance for a frail person or for a worker in a physically demanding environment but would fall toward the opposite pole for a person of strong constitution with a desk job. Another potentially absence-inducing event, a back strain, might be more likely to occur—and result in an absence for—a construction worker than for an executive.

Individual differences like those proposed by Nicholson (1977) are certainly plausible enough to search for, but the typical design in the absenteeism literature is not very sensitive to them. Morgan and Herman (1976) serve as an example here in that they were primarily interested in documenting the average impact of absence-relevant events on the foundry employees as a whole. Specifically, they collected data from each subject on only one occasion, then averaged their findings across members of the sample. This often-used approach is desirable if the primary interest is in determining how the average person feels about an issue. However, it is a weak strategy for uncovering individual differences because the averaging process by definition washes out whatever differences may exist.

In another study of volition and absenteeism, Nicholson and Payne (1987) used home interviews in which workers were asked (1) how frequently they had encountered each of 12 classes of potential absence-causing events during the previous two years, (2) how likely each of those classes of events would be to cause them to miss work, and (3) which events most influenced their decision to miss work for each of their absences over the previous two years. The researchers stratified the interviewees by gender and occupation (blue-collar versus white-collar) with the expectation that differences in group membership might partially account for individual variations in the resulting profiles of volitional absenteeism.

Some support for group-level differences in relation to absence-inducing events emerged from Nicholson and Payne's work. For example, women more often than men attributed their past absences to illnesses in the family. A few differences by occupation also emerged. However, most notable was that, for all groups, minor ailments, such as colds, headaches, and upset stomachs, were more prevalent over the two-year period than were any of the other classes of absence-inducing events, such as social functions or domestic disputes. Additionally, the workers studied reported minor ail-

ments to be the most common reason for their past absences. Yet, in response to the second question asked in the interviews, employees felt that minor ailments were unlikely to keep them away from work. In other words, their attributions regarding specific instances of past absences did not match their general perception that minor ailments would be an unlikely reason for them to be absent.

The Problem of Attribution Bias

In discussing their findings, Nicholson and Payne (1987) raised the possibility that attribution bias played a role. Specifically, they proposed that people may attribute negatively evaluated acts like absences to factors outside their own control—such as illness—rather than to events within their own control (getting up late, having time for personal business). Thus, according to those authors, “People are more liable to use quasi-medical reasons to justify their absence when it comes to reporting on actual events than when rating their own susceptibility” (1987: 131). Such a bias would also explain why the workers attributed few absences to events that left the choice to attend largely volitional.

As Nicholson and Payne acknowledged, perhaps asking people to report on their previous absences invites unintentional bias, because errors of memory or unconscious processes occur. To combat such potential bias, they suggested the use of more immediate and detailed research methods focusing on proximal time periods. In a similar vein, Johns and Nicholson noted an “apparent consensus that data methods that are closer to ‘real time’ should reduce distortions due to the passage of time.” “If this is so,” they added, “timely accounts of reasons for absence should have more variance than generalized retrospective reports and relevant context effects should be more readily accessible” (1982: 143).

One way Johns and Nicholson suggested these timely accounts could be obtained was to ask employees to keep absence diaries. The use of diaries is interesting conceptually because of the rich data it is likely to generate. Analysis of verbal reports is a complex process, however (Ericsson & Simon, 1984), and usually the use of more standardized measurement procedures facilitates the process of making scientific generalizations (Nunnally, 1978). For those reasons, our preference was for a method that would yield quantitative data without losing all of the potential richness offered by diaries.

An Idiographic-Longitudinal Study of Absenteeism

In the current study, we used an idiographic-longitudinal design in which the attendance behavior of individual nurses was tracked daily over several months. Nurses also completed daily ratings of the degree to which certain absence-relevant events, such as feeling tired or having personal business to take care of, were present. We then compared the event ratings made on days when the nurses decided to be absent with those made when the nurses attended. We also examined the event ratings relative to employ-

ees' daily expressed desire to be absent. This approach built on previous work in the following four ways.

The design was longitudinal, so that the data were collected in real time, not retrospectively as in Nicholson and Payne (1987). Accordingly, poor memory can be ruled out as a factor influencing the findings. Moreover, real-time data collection should reduce the type of bias that may exist in Nicholson and Payne's findings (Johns & Nicholson, 1982), and events that leave the decision to go to work in an employee's control ought to relate more strongly to absences than has been reported previously. Also, we expected that with real-time data collection, perhaps fewer absences would be associated with minor ailments *per se*, though the role of such occurrences was certainly unlikely to disappear entirely, given its previous robustness across samples (Chadwick-Jones, Nicholson, & Brown, 1982; Morgan & Herman, 1976; Nicholson & Payne, 1987).

By adding the desire to be absent as a variable, we were able to investigate more thoroughly the processes responsible for Nicholson and Payne's (1987) finding that employees seldom attributed their absences to events that left them a choice. As described earlier, attribution bias is one explanation for the finding, in that employees might simply be reluctant to attribute a negatively perceived occurrence to an event that is largely under their control (Nicholson & Payne, 1987). However, we offer another explanation based on the premise that a decision to miss work can often be viewed as a two-stage process. The first stage can be considered the stimulus event producing a desire to be absent. The second stage is the actual decision either to report for work or to stay away. If the first-stage event approaches the realm of no choice, there is little room for choice in the second stage; it is virtually by definition a decision to be absent. If the first-stage event approaches the realm of choice, a decision must be made; the employee must decide, considering the costs and benefits desired, whether the event justifies the absence. Accordingly, we suspect that there are many cases in which employees desire to be absent but nonetheless report for work. We argue that although events that are less justifiable reasons for absence surely increase an individual's desire to be absent, they seldom lead to an actual absence because during stage two most people decide that such an event does not justify missing work. This sequence would explain the lack of relevance of events that leave choice open to absences in Nicholson and Payne's findings without implying that employees actually take many avoidable absences and then disguise them as unavoidable. Moreover, if the two-stage model is correct, we expected the present study to reveal a strong relationship between events that leave choice open and the desire to be absent but only a weak association between such occurrences and actual absenteeism.

The design was idiographic. This aspect of the study allowed for the examination of absence behavior from two very different perspectives. First, in an extension of Morgan and Herman (1976), we collected repeated measurements from the same respondents over a period of months. Longitudinal collection allowed for individual-level analyses wherein the absence behav-

ior of each nurse was quantitatively examined and summarized separately. The second perspective we took involved averaging the findings across nurses. The goal here was similar to Morgan and Herman's in that we were looking for events that were absence-relevant for the group as a whole. Though our individual-level analyses were best regarded as exploratory, we expected at least to identify some absence-inducing events that were helpful in explaining the behavior of a subset of nurses but that lacked enough relevance for the group as a whole to emerge as significant predictors at the group level.

Multivariate analyses were used to examine the possibility that absence-inducing events are interrelated. For example, as Nicholson and Payne (1987) suggested, a serious overload of work duties might lead to (or at least be related to) other events like (1) disagreements with co-workers, (2) disagreements with supervisors, (3) stress-related depression, and (4) difficulties in getting up on time. Other examples from Morgan and Herman (1976) could be used to support the expectation that coherent patterns among absence-relevant events exist. Their identification might enhance our understanding of the dynamics underlying absences. Moreover, by using multivariate techniques to combine the information contained in multiple events optimally, our prediction of absences should improve over that offered by theorists employing univariate strategies in which events are used singly as predictors.

METHODS

Phase 1

Members of the nursing staff of two metropolitan hospitals completed a survey package designed to collect background information on various attitudinal, demographic, and organizational variables. Though we had no *a priori* reason to expect it, we were open to the possibility that absence cultures might differ across hospitals and produce substantial site variations (Johns & Nicholson, 1982).

The first group studied was from a general care hospital. We circulated 82 questionnaires, 66 (80%) of which were returned. Of the respondents, 97 percent were women, and 65 percent were single. Their average age and hospital tenure were 36.21 years (*s.d.* = 9.77) and 8.76 years (*s.d.* = 8.03), respectively. The other site was a children's hospital, where 140 questionnaires were circulated and 74 (53%) returned. Ninety-six percent of these respondents were women, 61 percent were single, and their average age and hospital tenure were 30.09 years (*s.d.* = 6.91) and 4.94 years (*s.d.* = 3.69).

Survey questionnaires were administered to small groups in both hospitals during the month of June. The survey provided hospital administrators with descriptive information regarding the work-related attitudes, values, and stressors of their personnel. Additionally, we included the following two items so that the major self-reported reasons for absences and attendance could be identified: (1) Think of the times when you took time off

from work in the past—list as many reasons for these absences as you can remember. (2) Think of the times when you felt like taking time off from work but chose *not* to—list as many reasons for having made this decision as you can remember.

The senior author grouped the absence-relevant events identified from these two questions in terms of their similarity. The grouping process was straightforward, as the classes that emerged were very narrowly defined. Table 1 shows the complete list of absence-relevant events identified by the nurses in the study's first phase, with the events' frequencies. Questions were then written to reflect the top-ranking events across hospitals. Two of the authors did this jointly, rewriting the items until both of us agreed that they adequately reflected the responses of the phase I respondents. Except for two items, the desire to be absent and job satisfaction, which we added to tap daily mood states, the questionnaire items were generated directly from the self-reports of the phase 1 nurses. The Appendix gives all the questionnaire items.

Phase 2

The nurses were asked to complete a questionnaire for each shift they were scheduled to work during the study's second phase, which lasted between four and five months. Additionally, we asked respondents to indicate whether or not they made their ratings on the day to which the ratings applied. Nurses completed 80 percent of the forms on the days to which they applied; all others were completed within two days afterward. This finding gave us confidence that we were tapping events in real time rather than retrospectively. All forms were analyzed together.

All nurses were told the research was aimed at better understanding the impact of work- and non-work-related events on such things as job satisfaction, mood states, and work behavior. We did not present absenteeism as the focus of our study. Our intent was to avoid any major behavioral changes associated with the fact that the study was in progress.

Of the nurses from phase 1, 54 agreed to participate in the longitudinal portion (phase 2) of the study. Of those participants, 26 were from the general care hospital. As in phase 1, almost all were women (96%) and many were single (60%); their average age was 37.8 years (*s.d.* = 10.36), and their mean tenure was 10.32 years (*s.d.* = 8.83). There were 28 phase 2 nurses from the children's hospital; all were women and many were single (62%). Their average age was 29.41 years (*s.d.* = 7.47), and their mean tenure was 4.32 years (*s.d.* = 3.90).

Phase 2 nurses received personal folders containing a two-week supply of rating forms, with instructions to keep them in their hospital lockers. A separate packet of forms was kept at home to complete for scheduled shifts in which they failed to report for work. Arrangements were made to exchange the completed forms with a new set once every two weeks. The senior author personally picked up the completed forms and delivered new

TABLE 1
Frequency of Stated Reasons for Absence and Attendance*

Reasons for Absence	General Hospital	Children's Hospital	Reasons for Attendance	General Hospital	Children's Hospital
Minor illness (self)	24 (25)	28 (20)	Responsibility to		
Mental health day	23 (22)	27 (19)	co-workers	26 (28)	40 (38)
Illness in the family	13 (13)	12 (9)	Guilt	12 (13)	9 (8)
Family social function	9 (8)	17 (12)	Loss of pay	8 (9)	9 (8)
Work to do at home	5 (5)	5 (3)	Avoid confrontation	8 (9)	5 (5)
Emotional problems	4 (4)	5 (3)	Responsibility to		
School work to do	3 (3)	3 (2)	patients	6 (7)	3 (3)
Bereavement	3 (3)	8 (6)	Unethical—dishonest	5 (6)	2 (2)
Physical fatigue	3 (3)		Work left undone	3 (3)	5 (5)
Professional			Recently absent a lot	3 (3)	1 (1)
appointments	2 (3)	1 (1)	Peer pressure	3 (3)	2 (2)
Obnoxious patients	1 (1)	1 (1)	Not sick enough	2 (2)	
Hangover—partying			Feel better at work	2 (2)	1 (1)
late	1 (1)	8 (6)	Family pressure	2 (2)	
Frustrated with work	1 (1)	4 (3)	Save for legitimate		
Snow storm—weather	1 (1)	2 (1)	reason	2 (2)	6 (6)
Misread time sheet	1 (1)		Avoid calling in sick	2 (2)	
Bought a house—			No one to do my job	2 (2)	1 (1)
moving	1 (1)	1 (1)	Given an enjoyable		
Nice day	1 (1)		task	2 (2)	2 (2)
Too little time off	1 (1)	3 (2)	Avoid health unit	2 (2)	
Hard to concentrate	1 (1)		Avoid bad record		6 (6)
No permanent ward	1 (1)		Committed to work		6 (6)
Shift change—tired	1 (1)		No sick time left		3 (3)
Worked overtime	1 (1)	2 (1)	Save for good weather		1 (1)
Missed bus—car			Enjoy co-workers		1 (1)
problem	1 (1)	2 (1)	Need M.D. certificate		1 (1)
Extend holiday		1 (1)	Can learn new things		1 (1)
Compassionate leave		2 (1)			
Ward is overstaffed		1 (1)			
House was robbed		1 (1)			
Pregnancy		1 (1)			
Religious holiday		1 (1)			
Mad at the supervisor		1 (1)			
Peace rally		1 (1)			
Missionary work		1 (1)			

* The percentages of all events reported within hospitals appear in parentheses.

ones, primarily to ensure that the momentum of the study was sustained among the nurses.

Because of constraints within the two hospitals, starting and finishing times for the second phase were staggered, with some nurses starting as early as August 30 and others finishing as late as February 26. Since most nurses worked rotating 12-hour shifts, they were scheduled to work only 14 shifts per month (twelve 12-hour shifts and two 8-hour shifts). The objective was to obtain a minimum of 50 observations (completed forms) from each nurse.

We did so for 46 (85%) of the 54 participating nurses. We tallied actual absences during phase 2 directly from hospital records.

Analyses

Univariate individual-level approach. To assess the extent to which the events reported daily were absence-relevant for individual nurses, correlations were computed between the responses to each item and (1) a nurse's daily self-expressed desire to be absent and (2) the actual decision about absence or attendance made. We performed these analyses separately for each of the 54 phase 2 nurses. For example, consider a participant who was in the longitudinal study for 60 shifts. The data for this nurse alone consisted of 20 arrays, each with 60 observations. The 60 ratings of job satisfaction the nurse made for the 60 scheduled shifts (see item 1 in the Appendix) made up the first array. Similarly, arrays 2 through 19 contained this nurse's 60 responses to the remaining items. The 20th array consisted of the nurse's attendance record for the 60 shifts, coded 0 for attendance and 1 for absence. Thus, by intercorrelating the appropriate arrays, we were able to assess the impact of the events for each nurse separately. The only difference among these individual analyses was the number of observations per nurse, as some were in the study for more shifts than others.

Univariate group-level approach. Next, the correlations pertaining to individual nurses were averaged. We chose not to use z to transform the correlations before averaging them because Hunter, Schmidt, and Jackson (1982) showed that this transformation gives undue weight to large correlations. Contrary to the individual-level approach, where our aim was to examine individual differences, our intent here was to identify events that were important to the nurses as a group. We summed the 54 individual-level correlations involving each two variables, then computed their average and standard deviation. For instance, the mean correlation between job satisfaction and the desire to be absent reflects the extent to which job satisfaction predicts the desire to be absent for the group as a whole. We repeated this procedure with each of the remaining sets of item-criterion correlations.

Principal components analysis. One shortcoming of the univariate analyses of previous research is that they have treated items as discrete entities even though the items may be related. For purposes of item reduction, we conducted a principal components analysis to create sets of correlated items. Clusters of correlated items give scores that are more reliable than responses to single items.

The correlations among the items shown in the Appendix served as the input for the principal components analysis, excluding item 9, the desire to be absent, which served as a dependent variable in the subsequent multiple regression analyses. Using a series of algorithms, the principal components analysis identified items that were interrelated and defined a new, reduced set of variables, referred to as components, that were linear combinations of the original ones. These components helped us identify the relationships among the original items and offered a reduced set of variables to use as predictors in individual-level multiple regressions. We also performed a

principal factor analysis, which involves statistical assumptions different from those of principal components analysis. The results were similar and are available from the first author on request.¹

Multivariate individual-level analyses. Since the components from the principal components analysis were linear combinations of the original items, each nurse had an array of scores associated with each component developed from the array of scores, or ratings, on each of the original variables. Moreover, as was the case with the original variables, the number of observations in each nurse's arrays corresponded to the number of shifts for which questionnaires were completed. We then used the scores on the components as predictors in individual-level multiple regressions to predict the variables of interest. We used the nurses' component scores rather than the original variables to increase the statistical stability of the regression results, as stability increases when the number of predictors is low relative to the number of observations. Since there were an average of only 60 observations per nurse, it was desirable to reduce the number of predictors from the original set of 18 variables.

There are two important aspects of the multiple regressions we performed to note. First, the analyses were again at the individual level. That is, we used the arrays of component scores associated with a given nurse to predict the behaviors of interest for that individual. The outcome of these analyses was two R^2 s for each nurse, one pertaining to absence desire and the other to actual absence. The other important aspect of the multiple regressions is that, unlike the previous individual-level analyses, which were all univariate, they were multivariate. Our intent was to combine the information contained in *all* the events optimally and thereby maximize the amount of variance explained in the variables. However, we could not conduct individual-level multiple regression analyses for all the nurses. Some did not have enough—or any—variance in the criteria; for instance, some nurses were not absent during the data collection period. This was true in 3 cases with absence desire as the criterion and in 22 cases when absenteeism was the criterion (32 nurses had at most one absence during the period covered by phase 2).

Multivariate group-level analyses. As for the univariate results, we averaged and obtained the standard deviations of the multivariate R^2 s across the nurses. We could then make group-level inferences concerning the average amount of variance explained by multivariate prediction across nurses.

RESULTS

Descriptive Statistics

The number of completed rating forms gathered from each nurse during phase 2 ranged from 24 to 82 ($\bar{x} = 60$; $s.d. = 12$). Of the 54 nurses, 46 stayed

¹ Kim and Mueller (1978) contains further details on principal components and principal factors analysis.

TABLE 2
Means, Standard Deviations, Reliabilities, and Correlations Among Items^a

Items	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Job satisfaction	2.28	.90	.59																		
2. Special event at work	1.12	.33	.01	.30																	
3. Poor attendance record	2.51	.54	-.03	.09	.97																
4. Finish work from last shift	1.19	.39	.09	.12	.20	.76															
5. Personal problems	3.06	.67	-.20	-.01	.02	-.01	.68														
6. M.D. must certify absence	1.10	.30	.04	-.03	-.22	.03	-.04	.95													
7. Loss of pay	1.22	.42	.10	-.03	-.22	-.14	-.08	.33	.96												
8. Patient-staff ratio	3.10	.72	.05	.04	-.01	.06	.03	-.04	-.04	.61											
9. Desire to be absent	2.82	.85	-.28	.06	-.05	.03	.35	.04	-.08	.00	.57										
10. Tiredness	2.93	.95	-.25	.07	.08	-.02	.15	-.09	-.17	.00	.43	.61									
11. Ill health	3.06	.61	.18	-.01	-.10	.01	-.16	.04	.08	.01	-.38	-.38	.66								
12. Death of family member or friend	1.02	.13	.02	.05	.01	.04	-.07	-.04	-.02	-.02	-.01	.01	.03	.67							
13. Sick family member or friend	1.03	.17	-.01	.04	-.05	-.05	-.15	.02	.01	-.02	-.11	-.10	.07	.00	.75						
14. Work at home to do	2.88	.65	-.03	.04	.00	.01	.19	-.01	-.07	.00	.20	.11	-.05	.00	-.06	.59					
15. Social event	1.13	.34	-.01	.05	.01	.07	-.05	.03	.00	-.01	-.09	.01	.00	.04	-.02	-.15	.40				
16. Sleep	1.19	.39	.11	-.01	-.08	-.01	-.11	.07	.15	.01	-.24	-.35	.21	.06	.08	-.12	.12	.37			
17. Ward short- or overstaffed	2.26	.68	.01	.01	-.02	.06	-.02	.12	.02	-.33	.02	.01	.04	.02	.03	.04	-.04	-.03	.74		
18. Stress	2.97	.70	-.27	.02	.04	-.09	.41	.05	-.01	-.06	.40	.27	-.27	-.01	-.12	.21	-.07	-.19	.03	.55	
19. Work interferes with home	1.21	.49	.04	-.04	-.01	-.05	-.15	.03	.12	-.04	-.30	-.09	.03	.03	.20	-.29	.24	.22	-.04	-.15	.64

^a All the statistics in this table were calculated across days (observations) and across nurses ($N = 2,950$). Reliabilities, which appear on the diagonal, were calculated by correlating employee responses on even days with their responses on odd days and applying the Spearman-Brown formula. Correlations of approximately .04 or greater are statistically significant at the .05 level.

in the study for the target period of 50 shifts. As was noted, they reportedly completed 80 percent of the forms on the day for which the ratings applied and the remainder within two days. We did not analyze forms not completed on the same day separately because, for most nurses, there were too few of them (6–10) to yield meaningful results.

For the phase 2 nurses, the mean frequency of absences over the 4-to-5-month monitoring period was 1.41 (s.d. = 1.17, range = 0–6). The average duration of each absence was two shifts. Twelve (22%) of the nurses were not absent at all during this period. For comparison, we summarized absenteeism statistics for 436 nurses from the two hospitals. Their mean frequency of absence for the entire year was 3.29. The comparison suggests that the absences of the nurses participating in the study were not artificially restricted because of the intervention. Table 2 displays the means, standard deviations, reliabilities, and intercorrelations among the questionnaire items.

The reliabilities in Table 2 were obtained using the standard Spearman-Brown formula (Ghiselli, Campbell, & Zedeck, 1981) and by correlating, for each item, even-day responses with odd-day responses across nurses and days of observation. In general, high reliabilities were associated with items (events) for which a high reliability would be expected, and rather low reliabilities emerged when purely situational, less stable events were involved. For example, for the attendance record during the previous three months, r_{xx} was .97, but for a special event at work, r_{xx} was .30. With regard to the item intercorrelations shown in Table 2, some of the larger values reflect reasonable expectations. For example, ratings of tiredness are associated with poor health ($r = -.38$). Still, many of the correlations are modest.

Each of the univariate analyses that followed was performed separately for nurses from each hospital. Since few significant differences arose, we report group-level results only for the two hospitals combined. Analyses by hospital are available from the first author.

Desire to be Absent: Univariate Findings

Individual-level results. The top part of Table 3 contains correlations between each absence-relevant event and the desire to be absent for the 54 participants in phase 2. Each row of correlations in the top portion of this table represents the data of one nurse. Examining the correlations row-wise allows the relative importance of the events to each nurse's desire to be absent to be assessed. For example, row 1 of Table 3 tells us that tiredness ($r = .49$), stress ($r = .46$), and work interfering with home activities ($r = -.26$) were all significantly related to the first nurse's desire to be absent. Row 2 shows the absence desire of the second nurse from the children's hospital is significantly related to those same factors, but for her, attendance record ($r = -.40$), personal problems ($r = .34$), health concerns ($r = -.32$), and sleep disruption ($r = -.24$) also enter the picture. Further row-wise comparisons reveal other individual differences. In particular, each of the

Nurse Number	Job Satisfaction	Special Event at Work	Poor Attendance Record	Finish Work from Last Shift	Personal Problems	M.D. Must Certify Absence	Loss of Pay	Patient-Staff Ratio	Tiredness	Ill Health	Death of Family Member or Friend	Sick Family Member or Friend	Work at Home to Do	Social Event	Sleep	Ward Short-staffed or Over-staffed	Stress	Work Inter-fares with Home	N ^a
Individual level: general hospital																			
01	-.21	.10	.06	.07	.39*	-.13	-.08	-.12	.60*	-.51*	.17	.51*	.03	-.46*	.38*	-.38*	.82		
02	-.51*	.20		.12	.41*			.15	.56*	-.52*		.46*	-.41*	-.10	.58*	-.52*	.35		
03	-.29	.26	-.07		.29	.02	-.07	.03	.42*	.06		.44*	.04	-.14	.18		.37		
04	-.28*		.03	-.13	.71*	.35*		-.02	.53*	-.39*		-.03	-.35*	-.42*	.35*	-.15	.72		
05	.39*	.02		.02	.70*			.05	.29*	-.19	.05	-.38*	-.70*	.02	-.02	-.02	-.48*	.64	
06	-.71*	.05	-.25		.62*	.30*		.31*	.35*	-.49*		-.18	.05	.25	.13	.58*	-.18	.52	
07	.10	-.19		-.08	.23			-.12	.14	-.02		.18	.05	-.30*	.15	-.34*	.59		
08	-.32*	.22*		-.10	.30*	-.21	-.07	-.03	.58*	-.53*	-.14		-.10	.05	.50*	.04	.73		
09	-.42*	-.07	-.01	-.07	.55*	.16	.16	-.14	.63*	-.42		.16	-.19	-.58*	.46*	-.08	.67		
10	-.30*	.15	-.06	-.10	.28*	-.12		-.07	.58*	-.65		-.26*	-.02	-.23*	.05	.39*	-.32*	.82	
11	-.19	.10	.11		.46*			-.25*	.46*	-.68*	-.02		.11	-.16	-.19	-.10	.57*	-.14	.63
12	-.30*	.29*	-.06	-.10	.04		-.43*	-.07	.31*	-.34*		.06	.41*	-.29*	-.23	.20	.41*	-.52*	.63
13	-.41*	.00		.05	.39*			-.06	.49*	-.65*		-.30*	.22*	-.39*	.39*	-.09	.38*	-.30*	.73
14	-.44*	.25*	.05	-.28*	.17	-.07		.08	.63*	-.58*		-.05	.22	.02	.55*	.11	.25*	-.15	.70
15	-.02	.19	-.28*	.13	-.28*			.29*	.48*	-.13		-.06	.21	-.21	-.21	.11	.17	-.23	.60
16	-.26*	-.22		-.16	.21			.00	.65*	-.46*			.16	.07	-.30*	-.13	.22	.02	.62
17	-.30*	-.14		.06	.15			.09	.39*	-.45*	-.11	.00	.21	-.16	-.18	.14	-.21	.73	
18	-.16	.13			.08		-.09	-.20	.37*	-.22	-.22		.27*	-.27*	-.24	-.21	-.17	-.77*	.59
19	-.03	-.02		.06	.30*	-.48*	.14	.10	.18	-.29*		-.08	-.37*	-.23	.48*	-.55*	.59		
20																			.11
21	-.23	-.08		.09	-.09	-.28		-.22	.60*	-.36*		.21	-.30*	-.25*	.31*	.09	-.15	.65	
22	-.55*	.00		-.15	.11	-.10	-.14	.08	.62*	-.29*		.28*	-.09	-.18	.18	.60*	-.59*	.79	
23	-.32*	.13	.15	.18	.46*	-.19	.20	.16	.61*	-.53*		-.06	.03	.25*	-.12	-.09	.52*	-.23	.72
24	-.31*	-.01		.00	.09	.00	-.13	.07	.47*	-.19	-.28*		-.03	.19	.00	.03	.19	-.13	.71
25	-.32*	.11	-.04	-.17	.38*			.18	.36*	-.14	.06		.22	.14	-.33*	.30*	.31*	-.31*	.60
26	-.23*	.10	-.12	.17	.43*		.14	.33*	.35*	-.33*	-.19	.14	-.03	-.03	-.01	-.17	.37*	-.04	.81
Group-level: both hospitals																			
Means	-.24	.07	-.07	-.03	.30	-.07	-.02	.01	.46	-.35	-.09	-.17	.17	-.11	-.21	.01	.36	-.30	.60
s.d.	.20	.17	.15	.15	.23	.23	.25	.16	.18	.19	.16	.19	.18	.21	.19	.20	.21	.18	
Number	26	6	3	3	29	4	6	6	47	33	3	9	18	14	24	11	35	27	
for whom significant																			

* Blanks indicate zero variance in one of the two variables involved, and the means do not include nurses to whom this pertained. Desire to be absent is a negatively keyed item for which a rating of 1 on a 5-point scale signifies the greatest desire to be absent.

^a N represents the number of observations per nurse.

* $p \leq .05$ or better

Nurse Number	Job Satisfaction	Special Event at Work	Poor Attendance Record	Finish Work from Last Shift	Personal Problems	M.D. Must Certify Absences	Loss of Pay	Parent-Staff Ratio	Tiredness	Ill Health	Death of Family Member or Friend	Sick Family Member or Friend	Work at Home	Social Event	Sleep	Over-staffed	Ward Short-	Work Inter-faces with Home	Desire to Be Absent ^b
01	.09	-.10	.03	-.12	-.04	-.01	-.02	.01	-.31*	.38*	-.03	1.00*	-.01	-.07	.30	.16	-.15	-.03	-.23*
02				.07	.19					.20			.12	-.10	-.09	.18		-.11	
03	.15	-.08	-.16			-.04		-.04	-.49*	.54*			-.04	-.07	.25	-.04			.03
04																			
05																			
06	.21	-.09	.00		-.10	-.70*			-.34*	.45*		-.03	-.18	-.08	.17	.09	-.06	-.03	-.42*
07			-.31*	-.02	-.41*					.18			.03	-.05	-.06	-.03	-.34*	.41*	
08	.82*	.30*		-.03	.01	-.02	-.03	.29	-.28*	.41*	-.01		.03	-.04	-.02	-.18	-.60*	-.04	-.34*
09	.27*	-.06	-.25*	-.07	-.03	.03	.03	-.10	-.19	.29*			.08	-.05	.25*	-.15	-.31*	-.11	-.20
10	.17	-.05	.01	.14	.01	-.01				.39*		-.05	.02	-.04	-.06	-.05	.00		-.31*
11	-.04	-.04	.03	-.10	-.10			-.04	-.16	.17	-.03		.08	-.04	-.05	.06	-.26*	-.05	-.32*
12			.04	-.03	.05		.02			.51*		-.02	.07	-.06	.24	-.08	.08	-.05	-.30*
13	.05	-.06		-.07	.02			-.04	-.47*	.37*		-.02	-.22	-.07	.34*	.15	.01	-.02	-.42*
14	.07	-.11	-.11	.44*	.14	-.06		.02	-.36*	.54*		-.09	.20	-.05	.21	.03	.03	-.26	-.39*
15	.13	-.05	.08	-.02	.03		-.29*	-.29*	-.33*	.19		-.04	.09	-.04	.07	.12	.04		.13
16																			
17																			
18	-.05	-.03			-.51*		.02	-.25*	.12	.38*	.48*		-.07	.18	-.18	.47*	-.28*	.09	-.10
19	.01	-.03		-.02	.01	-.02	-.04		-.24	.55*			.07	-.07	-.04	-.06	-.41*		-.48*
20																			
21		-.04		-.01	-.01	-.01			-.28*	.13			-.14	-.05	-.10		.01		-.28*
22	.10	.14		-.04	.04	-.02	-.02		-.12	.35*			.03	-.05	-.07	.07	-.08	-.07	-.15
23	.14	-.07	-.10	-.05	.01	-.04	-.23*	.08	-.27*	.41*		-.05	-.09	-.06	.09	.37*	-.02	.25*	-.38*
24	-.08	-.02		-.04		.28*	-.03	.00		-.02	-.01		.05	-.04	-.06	.24*	.00	-.04	.28*
25																			
26																			
Group-level: both hospitals																			
Means	.15	-.02	-.04	-.01	-.07	-.02	.01	.02	-.25	.39	.15	.05	.03	-.02	.09	.05	-.13	.01	-.25
s.d.	.18	.10	.11	.13	.18	.25	.22	.16	.14	.17	.32	.25	.13	.10	.15	.15	.19	.20	.19
Number for whom significant	7	1	2	2	7	3	3	4	17	33	4	2	1	1	6	4	12	3	26

* Blanks indicate zero variance in one of the two variables involved, and the means do not include nurses to whom this pertained. The number of observations per nurse is the same as shown in Table 3.

^b The counter-intuitive negative correlations between actual absence and absence desire result from the latter being a negatively-keyed item, with a rating of 1 on a 5-point scale indicating the greatest desire to be absent.

* $p < .05$ or better

events shown in Table 3 was significantly related to the absence desire of at least three nurses.

Group-level results. The bottom portion of Table 3 displays the relative importance of the events that emerged when we averaged item-criterion correlations across nurses. We considered personal problems, tiredness, health concerns, stress, and work interfering with home activities to be important predictors for the group as a whole. Each had an average correlation of at least .30 with the desire to be absent. From this group-level perspective, none of the other events would be considered to have associations with the desire to be absent, a conclusion that of course differs from what we derived from the individual-level analyses, which showed each event to be important for some of the nurses.

Actual Absenteeism: Univariate Findings

Individual-level results. The top portion of Table 4 shows the correlations between the absence-relevant events and actual absences. These findings can be examined in the same fashion as the results on the desire to be absent, with row-wise variation indicating individual differences. In this table, the desire to be absent appears as a predictor. Row-wise examination of Table 4 reveals that although there was some consistency across nurses in the events associated with absences, there were also notable differences. A comparison of nurses 10 and 13 from the children's hospital graphically illustrates the latter point. The absences of nurse 10 are significantly related to job satisfaction, personal problems, loss of pay, tiredness, health concerns, stress, and the desire to be absent. In contrast, only one event, the death of a family member or a friend, is needed to explain all the variance in the absence behavior of nurse 13. The pattern for the second nurse from the general hospital was similar. A single occurrence of one event, the sickness of a family member or friend (item 13) explained all of her variance in absence behavior. Further row-wise comparisons reveal that most events were significant predictors for a subset of nurses.

Group-level results. The bottom portion of Table 4 shows the relative importance of events when results are averaged across nurses. From this group-level perspective, we considered tiredness, ill health, and the desire to be absent useful predictors of absences. All had mean correlations at least in the mid-20s with the nurses' daily decision to be absent or present. None of the other events had strong average relationships to absences. However, as was noted, the individual-level findings revealed that many of the events were important for subsets of the nurses.

Summary of the Univariate Findings

The strongest, most consistent correlates of the nurses' daily expressed desire to be absent were tiredness, personal problems, ill health, stress, and work interfering with home activities. Only a subset of these—tiredness, ill health, and absence desire when it was used as a predictor—emerged as consistent predictors of actual absences. Overall, the best single predictor of

the desire to be absent was feeling tired ($\bar{r} = .46$), whereas ill health best predicted absences ($\bar{r} = .39$). Individual-level results that identified each event as important in explaining the behavior of at least one nurse supplemented the group-level findings. The next obvious question was to what extent prediction could be improved, both for individual nurses and the group, by optimally combining the information contained in all the items? The principal components and multiple regression analyses answered that question.

Principal Components Analysis

The analysis was performed across both days of observation and nurses. The resulting components were therefore based on 2,995 observations. As explained earlier, our goals were to look for interrelationships among the various absence-relevant events and obtain a reduced set of variables to use as predictors in individual-level multiple regressions. Table 5 shows the components, each a linear combination of the original items, defined by the principal components analysis.

Seven components with eigenvalues greater than one emerged from analysis. Together, they accounted for 56 percent of the variance among the set of original variables. With a few exceptions, we interpreted the components by examining loadings on each component of .34 or larger (these are underlined in Table 5). The labels we chose for the seven components were as follows: doldrums, describing low spirits, emotional and physical fatigue, and feeling down-trodden; poor standing, defined in terms of having to provide medical certification for absence, loss of pay, and having a poor attendance record; home responsibilities, comprising activities at home, nonwork social events to attend, and work to be done at home; overstaffing, defined primarily by the item for a higher than usual staff-to-patient ratio; work responsibilities, denoting a desire to finish work from the last shift and a desire to attend a special event at work; disrupted sleep, defined primarily by the item for lost sleep; and compassionate leave, relating to a sick friend or relative's requiring care or to a recent death among family or friends.

With the seven component scores representing the information contained in the original 18 variables, there were only seven arrays of predictor information for each nurse. We performed a multiple regression analysis for each nurse separately, using the seven arrays of principal components analysis scores to predict the desire to be absent and actual absences.

Desire to be Absent: Multivariate Findings

Individual-level results. For each of the 51 nurses for whom the analysis was possible, the top portion of Table 6 shows (1) the standardized regression coefficient associated with each component, including whether the component was a significant predictor of the nurse's desire to be absent; (2) the total variance explained (R^2); and (3) the R^2 adjusted for shrinkage by the Lord-Nicholson formula (Schmitt, Coyle, & Rauschenberger, 1977).

In a now familiar pattern, row-wise comparisons of the individual-level

TABLE 5
Principal Components Analysis of the Absence-Relevant Events^a

Principal Components and Their Labels ^b							
Items	Doldrums	Poor Standing	Home		Work		Compassionate Leave
			Responsibilities	Over-staffing	Responsibilities	Disrupted Sleep	
Job satisfaction	-.28	-.09	-.33	.00	.11	-.18	-.18
Special event at work	-.04	-.19	-.04	.14	.39	-.21	.53
Poor attendance record	-.14	-.43	.00	.21	.05	.12	-.13
Work from last shift	-.00	-.32	-.19	.25	.47	-.09	-.15
Personal problems	-.34	.15	-.01	-.17	.17	.43	.01
M.D. must certify absence	.13	.45	.00	.04	.42	-.27	-.04
Loss of pay	.22	.45	.06	-.12	.24	-.15	.01
Patient-staff ratio	.00	-.25	-.09	-.59	.19	-.19	.12
Tiredness	-.40	-.04	.27	.06	.00	-.32	.02
Ill health	.33	.00	-.33	.00	-.06	.28	.09
Death of family member or friend	.04	-.11	.03	.17	.10	.25	.44
Sick family member or friend	.17	.00	.15	.10	-.31	-.23	.55
Work at home to do	-.25	.13	-.39	-.00	.06	.08	.28
Social event	.12	-.14	.43	.05	.39	.17	-.12
Sleep	.35	.02	.04	-.07	.14	.46	.14
Ward short or overstaffed	.00	.24	-.10	.65	-.04	.01	-.07
Stress	-.40	.26	.11	-.03	.15	.22	.11
Work interferes with home	.27	-.05	.52	.03	-.01	.06	.02
Eigenvalue	2.53	1.63	1.42	1.34	1.17	1.05	1.04
Percent of variance accounted for	14	09	08	07	07	06	05
Cumulative variance	14	23	31	38	45	51	56

^a This analysis was performed across nurses and across observations; $N = 2,995$. Loadings of .30 or larger helped define the components and are underlined.

^b Components with eigenvalues greater than 1 were retained for interpretation.

results reveal large differences. In some cases—nurse 6 of the children's hospital, for example—none of the components was a significant predictor of the desire to be absent, and not surprisingly, significant variance was not accounted for. At the other end of the spectrum, we have nurse 23 of the general hospital, for whom three of the seven components contributed significantly toward explaining 67 percent (adjusted) of her desire to be absent. Each component was a significant predictor for at least five nurses.

Group-level results. As the bottom part of Table 6 shows, the most consistent predictor of the desire to be absent was doldrums, which was statistically significant ($p < .05$) for 36 of the 51 nurses. Other common predictors included poor standing and home responsibilities, each significant for 11 nurses, and overstaffing, significant for 10 nurses. When we optimally combined the information in the component scores using multiple regression, an average of 47 percent of the variance in absence desire was explained, and 32 percent was explained after adjustment for shrinkage (see the R^2 summary near the bottom of Table 6). This average figure again masks the individual differences apparent from the corresponding individual-level analyses.

Actual Absenteeism: Multivariate Findings

Individual-level results. The top portion of Table 7 shows, for the 22 nurses with the required data, the results of the individual-level regression equations with actual absences as the criterion. The absences of nurse 26 of the general hospital were predicted the most successfully; five of seven component scores contributed significantly to explain an adjusted 74 percent of the variance in her absence behavior. There were, however, numerous cases in which the component scores failed to predict absence episodes—for example, nurse 11 and 19 from the children's hospital.

Group-level results. The bottom portion of Table 7 shows that the predominant predictors among the 22 nurses were doldrums, significant for 8 nurses; home responsibilities, significant for 7 nurses; and disrupted sleep, significant for 6 nurses. The group-level R^2 summary suggests that an average of 31 percent of the unadjusted variance in absences could be explained by using multiple regression to combine the information contained in the daily ratings; 20 percent of the variance was explained when R^2 was adjusted. These findings of course again mask the differences in predictive success tied to the particular individuals involved.

Summary of the Multivariate Findings

The principal components analysis yielded several interpretable components suggesting that the absence-relevant events nurses identified were somewhat interrelated. Moreover, as expected, using multiple regression to combine the information contained in all the items optimally resulted in better prediction overall—32 percent for the desire to be absent and 20 percent for actual absences—than that attainable from the best single predictors of behavior. One commonality among the univariate and multivariate

TABLE 6
Multiple Regression Results for the Desire to be Absent

Nurse Number ^a	Doldrums	Poor Standing	Home Responsi- bilities	Over- staffing	Work Responsi- bilities	Disrupted Sleep	Compas- sionate Leave	R ²	Adjusted R ^{2b}
Individual-level: children's hospital									
01	.00	1.38*	-.24	-.61*	.43	-.80*	.09	.44*	.27
02	-.35*	.37*	-.18	-.08	.17	.19	.18	.42*	.26
03	-.42*	.16	.10	.09	.14	.09	.00	.45*	.28
04	-.25	.96	.38	-.30	1.24	-.25	-.32	.44	-.07
05	-.48*	.50*	.13	-.43*	.36*	.03	.23*	.69*	.59
06	-.75	-.40	-.15	.34	.00	.24	-.15	.29	.05
07	.39	.34	.90*	-.23	-.07	-.40	.72	.58*	.30
08	-.41*	.31	.07	.08	.04	-.26	-.13	.39*	.18
09	-.90*	.10	-.10	-.15	.62*	.40	-.28	.52*	.38
10	-.56*	.20	.24	-.21	-.03	.25	.23	.39*	.16
11	-.50*	-.11	.25	-.08	.19	-.16	-.08	.42*	.22
12	-.71*	.11	-.14	-.30*	.45*	-.07	-.22	.45*	.28
13	-.33*	.07	-.09	-.19	-.12	-.18	-.09	.30	.09
14	-.37*	.12	-.36*	.14	-.14	.24	.12	.34*	.13
15	-.34*	.11	.20	-.03	.41*	-.32	.06	.51*	.38
16	-.05	.02	.16	.15	.09	-.36*	-.30*	.37*	.18
17	-.58*	-.07	-.03	-.06	.23	-.04	.07	.35*	.16
18	-.78*	-.09	-.10	.02	.05	-.05	-.03	.71*	.57
19	.09	.58	.14	-.17	.10	-.16	-.06	.50*	.24
20	-.62*	.48*	.16	-.21	-.13	-.09	-.19	.68*	.57
21	-.66*	-.46	-.27	.24	-.17	.90*	-.20	.53*	.23
22	-.58*	.13	.25	-.33*	.02	.13	-.04	.29*	.06
23	-.94	-.42	.21	.57*	.10	.22	.19	.63*	.49
24	-.02	-.35*	-.04	.67*	.22	-.53*	.62*	.55*	.34
25	-.45*	.04	.10	.00	.15	-.22	-.12	.52*	.39
26	-.68*	.12	.29*	-.44*	-.06	.62*	.41*	.64*	.53
27	-.26	.37*	.10	-.15	.27	-.25	.11	.32*	.12

Nurse Number ^a	Doldrums	Poor Standing	Home Responsibilities	Over-staffing	Work Responsibilities	Disrupted Sleep	Compensation Leave	R ²	Adjusted R ^{2b}
Individual-level: general hospital									
01	-.74*	-.18	.02	-.03	.09	.01	-.04	.50*	.39
02	-.63	-.05	.00	.07	-.01	-.02	.19	.47*	.13
03	-.74*	.38*	-.08	-.27	.23	.27	.29	.42*	.11
04	-.59*	.67*	-.17	-.13	-.20	-.06	-.69*	.60*	.49
05	-.02	-.16	.25	.09	.03	-.11	-.22	.09	-.29
06	-.39*	.12	.34*	-.41*	.10	.03	.14	.74*	.65
07	-.35	.01	-.32	-.09	.23	-.02	-.43*	.23	-.01
08	-.56*	.03	.38*	-.13	.17	-.02	.14	.52*	.41
09	-.60*	.17	.16	-.03	.04	-.12	-.01	.58*	.47
10	-.90*	-.04	.20*	.03	.04	-.02	.29*	.54*	.44
11	-.78*	-.07	.24*	-.04	-.25	-.10	.18	.55*	.42
12	-.53	-.04	-.10	-.03	.07	-.18	.13	.53*	.37
13	-.103*	-.59*	.03	.13	-.15	.05	-.03	.52*	.41
14	-.68*	-.19	.08	.00	.10	.36	.20	.55*	.43
15	-.43*	-.10	-.11	.06	.18	-.04	-.05	.27*	.12
16	-.46*	.10	.37*	-.07	.00	-.26	-.26	.52*	.38
18	-.33*	-.11	-.55*	.15	-.05	.03	.00	.52*	.36
19	-.44*	.39*	-.40*	-.28*	.15	-.10	-.06	.50*	.34
21	-.70*	-.18	-.18	.28	-.16	.35	-.23	.36*	.18
22	-.76*	.10	.03	.06	.11	.07	.01	.58*	.49
23	-.69*	-.10	.43*	-.15	.17	-.11	.10	.71*	.67
24	-.55*	.03	.16	-.07	.15	.22	-.08	.25*	.07
25	-.26	.31	.40	-.04	.00	-.23	.44	.51	-.20
26	-.19	.31*	.11	-.35*	-.30*	-.17	.17	.39*	.26
Group-level: both hospitals									
Number for whom significant	36	11	11	10	5	5	7	45	
Means									
s.d.									
								.47	.32
								.14	.16

^a Nurse 28 of the children's hospital and nurses 17 and 20 from the general hospital were omitted from these analysis because of a lack of variance in the variables involved. The number of observations per nurse is approximately the same as in Table 4.

^b These estimates of shrinkage are based on the Lord-Nicholson formula (Schmitt et al., 1977).

* $p < .05$ or better

TABLE 7
Multiple Regression Results For Actual Absences

Nurse Number ^a	Doldrums	Poor Standing	Home Responsibilities	Over-staffing	Work Responsibilities	Disrupted Sleep	Compassionate Leave	R ²	Adjusted R ^{2b}
Individual-level: children's hospital									
03	.00	-.28	-.15	-.10	-.28	.30	.36*	.25	.02
09	.70*	-.23	-.21	.13	.05	-.30	-.10	.36*	.17
11	.15	.04	-.12	.11	-.20	.00	.19	.20	-.06
12	.18	-.08	-.52*	.00	-.07	.09	-.10	.35*	.13
16	-.35	-.63*	-.33	.30	-.35*	1.00*	-.15	.58*	.46
18	.24	.41*	-.20	-.08	.53*	-.14	.18	.42*	.13
19	.41	.23	-.37	.08	-.13	.11	.08	.29	-.07
20	.50*	.18	-.42*	.24	.04	.18	.08	.29*	.06
24	.31	.16	-.49*	.28	.12	.16	-.07	.41*	.14
25	.79*	.95*	-.42*	-.24	.36*	-.57*	-.08	.42*	.20
27	.32	.02	-.13	.06	.05	.12	-.13	.14	-.11

TABLE 7 (continued)

Nurse Number ^a	Doldrums	Poor Standing	Home Responsi- bilities	Over- staffing	Work Responsi- bilities	Disrupted Sleep	Compas- sionate Leave	R ²	Adjusted R ^{2b}
Individual-level: general hospital									
01	.26	.16	-.29	.00	-.02	.28*	-.01	.23*	.07
03	.26	.20	-.03	-.12	-.27	-.12	.24	.14	-.31
08	.42*	-.29*	-.31*	.20	-.09	-.25	.00	.42*	.28
09	.22	.13	-.21	-.03	-.02	.16	-.15	.10	-.14
11	-.09	-.20	-.23	.19	-.06	.02	-.08	.07	-.21
13	.42*	.11	-.20	-.04	.06	.51*	.01	.32*	.16
14	.05	.12	-.40*	-.03	-.03	.32*	.18	.32*	.14
18	.34*	.10	-.15	.51*	-.09	-.32	-.01	.45*	.27
22	.14	-.04	-.22	.08	-.18	.01	.19	.10	-.10
23	.27*	.01	-.22	.12	-.07	.33*	-.02	.27*	.06
26	.65*	.25*	.33*	-.03	.14	-.52*	.30*	.79*	.74
Group-level: both hospitals									
Number for whom significant	8	5	7	1	3	6	2	12	
Means									
s.d.									
								.31	.20
								.17	.18

^a Nurses who had little variance in their absences could not be included here. The number of observations per nurse is approximately the same as in Table 4.

^b These estimates of shrinkage are based on the Lord-Nicholson formula (cf. Schmitt et al. 1977).

* $p < .05$ or better

results was the prevalence of individual differences. Group-level summaries consistently masked the fact that multivariate prediction was excellent for some nurses but very poor for others.

DISCUSSION

Real-Time Data Collection and Attribution Bias

As in previous studies (Chadwick-Jones et al. 1982; Morgan & Herman, 1976; Nicholson & Payne, 1987), employees said that ill health was among the most common reasons for previous absences. It was also the single strongest correlate of absenteeism in the longitudinal phase of this study. We expected, however, that some events less justifiable as reasons for absence would also emerge from the longitudinal design as absence-relevant. This expectation was confirmed for the desire to be absent in that personal problems, feeling tired, and stress were significant correlates for the nurses overall, though none of those events emerged, in the univariate analysis at least, as group-level correlates of actual absences.

Since most of our data were obtained on the days to which they applied, poor memory can virtually be ruled out as an explanation for the lack of relevance that events that left the choice of whether or not to attend up to the nurses apparently had to the absences of most nurses. Despite real-time data collection, the possibility remains that nurses consciously adjusted their ratings to make their absences appear justified. We tried to minimize the possibility of such bias by presenting absenteeism as only one of the variables of interest in the study, assuring participants that all information they provided would be kept strictly confidential, and providing incentive to the nurses to give frank responses by promising them individualized feedback.

Beyond Bias: Findings Involving the Desire to be Absent

Evidence against bias and for the validity of our data comes from the following facts: (1) most of the forms were completed on time, as requested, (2) nurses' self-reports of absence corresponded perfectly with hospital records, and (3) consistent patterns of responses did not develop as the study wore on, though responses may have become less thoughtful. In connection with this last point, the standard deviations for the items (see Table 2) reflect considerable daily variation in the questionnaire ratings. The pattern of item reliabilities is also indicative of valid ratings. Specifically, where consistency in the responses to an item was or could be expected, it emerged. For example, given the relatively low level of absences during phase 2, we would expect the responses to item 3, concerns about attendance record during the past three months, to be very stable, and they were. Moreover, when the nature of an event dictated only a modest degree of consistency, as in the case of personal problems and tiredness, for example, only modest consistency emerged. Taken together, these findings support the contention that the nurses' responses were valid indicators of how they felt on a given day.

The group-level emergence of nonjustifiable events in relation to absence desire can also be used to indirectly argue against pervasive bias in these data. In particular, the two-step process outlined earlier, in which events that do not demand an absence generally increase the desire to be absent but rarely result in actual absences, is a reasonable interpretation of the findings that deemphasizes bias. Perhaps many people resist their desire to be absent (desire and actual absences correlated only .25 on average) in response to less justifiable events unless and until more justifiable quasi-medical manifestations like ill health appear as well. Perhaps events like those defining the doldrums component wear employees down over time and turn what would otherwise be viewed as an unjustified desire into a justified and necessary absence. Catastrophe models (Sheridan, 1985) could be used to examine these possibilities with a sample in which the rate of absences is higher. The point here is that bias is not the only explanation for the weak relationship of absences to events that are less justifiable reasons for absence and that other possibilities should be investigated as well.

The Benefits and Shortcomings of an Idiographic-Longitudinal Design

One very desirable aspect of the design we used was that it allowed us to examine the absence behavior of nurses as individuals as well as to take the more typical approach of looking for average trends across individuals. The benefits of allowing for both perspectives were substantial. Repeatedly, variables labeled as having little significance at a group level nonetheless emerged as significant predictors for at least some, and usually many, individuals. We observed this pattern of findings with both criteria and with both the univariate and multivariate analyses.

Like most research strategies, ours also has disadvantages. For example, compared to the one-time data collection strategy typically used in absenteeism research, the idiographic-longitudinal approach demands a tremendous amount of time and effort on the part of both researchers and participants. Moreover, despite our efforts, the data set was unsatisfactory on at least two counts. First, the average number of observations per nurse was only 60, even though data collection occurred daily for nearly five months. The small group size meant the findings pertaining to individual nurses were somewhat unstable. Indeed, when we used the formulas of Hunter, Schmidt, and Jackson (1982) to correct the individual-level correlations for sampling error, about half the variance across nurses could be attributed to this artifact; we observed variations simply because the number of observations was too small to yield highly stable individual-level correlations. The implication, of course, is that not all the variance across nurses reflects individual differences. The only way to overcome sampling error would be to have more observations per individual, but in practice, finding a willing group of such individuals is a less than straightforward task. In addition to the low average amount of data, the other less than ideal aspect of this data set was that relatively few absences occurred. We cannot know what the findings would have been had the rate of absences been higher.

Our approach also failed to live up to our expectations with regard to the average amount of variance explained in actual absences. At best, the 22 percent overall adjusted figure we obtained was on par with the one-shot partial tests of the Steers and Rhodes (1984) model. However, as implied above, the benefits of the idiographic-longitudinal approach probably come not in the average amount of variance explained, but from the increased understanding of individual behavior it offers. For example, a one-shot across-subjects test of the 18 events used in this study would have likely concluded that deaths and sickness among family and friends do not account for much variance in absenteeism. Such a conclusion would have been incomplete and misleading, however. People like nurse 13 of the children's hospital and nurse 2 of the general hospital, whose absences were completely explained by one of these two events, would have been lost in the averaging process. Moreover, a one-time data collection strategy would likely miss the variation of infrequently occurring events like these and be relatively insensitive to the transitory states of emotional and physical fatigue tapped in this study.

Two components of Steers and Rhodes's (1978, 1984) model explicitly or implicitly covered many of the events generated by the nurses and studied by us: the ability to attend and the motivation to attend. Since we found that the impact of these events varied across individuals, it is likely that the one-shot (across-subjects) data collection strategies typically used to test Steers and Rhodes's model fail to capture the full understanding and predictive power the model offers. In the future, those attempting to evaluate the contribution of the proximal predictors in that model should employ a strategy like the one used here.

The Interrelationship Among Absence-Relevant Events

Interrelationships among the absence-relevant events were successfully identified via principal components analysis. Moreover, as expected, using multivariate analyses to combine the information contained in the ratings improved prediction over the univariate strategies. Though not all the components were easy to interpret, the first, called *doldrums*, was. The component perhaps represents an empirical definition of the motivation for the "mental health day" that many nurses in the study's first phase gave as a reason for past absences; only minor illness was a more frequently given reason (see Table 1). Moreover, the predictive power of scores from this component suggests nurses stay away from work primarily to deal with periodic bouts of emotional-physical fatigue. If that is true, perhaps occasional absences are functional (Staw & Oldham, 1978; Steers & Rhodes, 1978), at least in the sense that they help dispirited nurses deal with the social-emotional and physical demands the occupation entails (Parkes, 1982). If the brief retreat from work-related stress that absences apparently provide helps prevent *doldrums* from developing into a more permanent and costly state of burnout, the makers of absence policies must consider this

potential benefit in conjunction with the immediate costs (Cascio, 1987) inherent in nonattendance.

CONCLUSIONS

This study answered the call for more thorough investigation of extraorganizational factors as they relate to absenteeism (Johns & Nicholson, 1982; Steers & Rhodes, 1984). Also, from a purely methodological perspective, we studied absences using the painstaking idiographic contingent approach that some believe to be an essential prerequisite for theory development (Johns & Nicholson, 1982).

The result of our approach was that we identified some common absence-inducing events across nurses, but also found individual differences. Those findings suggest that although Nicholson and Payne's (1987) attempt to build a typology of absence-causing events by occupation and gender may be workable, some individuals within such groups will undoubtedly evaluate the same set of objective absence-inducing circumstances differently from the others.

Our study further showed that although many of the same events related to the desire of many nurses to be absent, their influence was less uniform on actual absences. The question then arises as to what individual factors are responsible for taking some of the nurses we studied over the threshold, from a state of desiring to be absent to actual absence. We suspect that individual differences in work-related values, such as work ethic (Hackett & Guion, 1985; Steers & Rhodes, 1978), might account for some of this variation, particularly when it occurs within groups of the same gender and occupation. In other words, value differences might explain why some people go to work almost at all costs even when the weather is particularly bad or when doctors, family, or friends advise against it, and others use any excuse they can think of to follow through on their desire to be absent.

Finally, even though an idiographic-longitudinal design was used here, we do not advocate the abandonment of more traditional approaches. Especially bearing in mind the noted shortcomings of our design, we agree with Luthans and Davis, who commented that "research in organizational behavior needs to proceed from the idiographic to the nomothetic and from the nomothetic to the idiographic and not from the nomothetic approach alone" (1982: 381).

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APPENDIX

Questionnaire Used by Phase 2 Nurses to Monitor the Occurrence of Absence-Relevant Events

1. In general, how satisfied are you with your job today? (a) very satisfied, (b) satisfied, (c) neither satisfied nor dissatisfied, (d) dissatisfied, (e) very dissatisfied
2. Are/were there any special events at work today that you are/were interested in attending? (a) no, (b) yes

3. In your opinion, your attendance record over the past three months has been: (a) poorer than most of your coworkers, (b) average, (c) better than most of your coworkers
4. Was/is there any unfinished work from your last shift that you want(ed) to complete today? (a) no, (b) yes
5. How much are there personal problems affecting you today (i.e. depression, domestic dispute, etc.)? (a) much more troubling than usual, (b) more troubling than usual, (c) neither more nor less troubling than usual, (d) less troubling than usual, (e) much less troubling than usual
6. Would an absence from work today require that you submit a doctor's certificate on return to work? (a) no, (b) yes
7. Would/will your absence from work today result in a loss of pay for you? (a) no, (b) yes
8. The number of patients on your ward/unit today, compared to the staff scheduled, is: (a) many fewer than usual, (b) fewer than usual, (c) same as usual, (d) more than usual, (e) many more than usual
9. How much would you have liked to take the day off today? (a) much more than usual, (b) more than usual, (c) neither more nor less than usual, (d) less than usual, (e) much less than usual
10. How tired were you just before your shift today? (a) very tired (very sluggish), (b) quite tired (quite sluggish), (c) neither tired nor particularly awake, (d) quite awake (quite energetic), (e) very awake (very energetic)
11. In general, how would you describe your health before your scheduled shift today? (a) much better than usual, (b) better than usual, (c) same as usual, (d) poorer than usual (i.e., minor ailments: cold, headache), (e) much poorer than usual (i.e., major ailments: high fever, migraine headache)
12. Has there been a death among family or friends over the last few days? (a) yes, (b) no
13. Is there a sick friend or relative whom you could be caring for at home today? (a) no, (b) yes
14. The amount of work needed to be done at home today is/was: (a) much more than usual, (b) more than usual, (c) about the same as usual, (d) less than usual, (e) much less than usual
15. Is there an important social event that you have had to, or will have to, prepare for today (i.e., entertaining, attending a family function)? (a) no, (b) yes
16. Was there any disruption today in the amount of sleep you normally get before your scheduled shift (e.g., due to a late party, sick spouse, or upset child)? (a) no, (b) yes
17. If you were not to show up for work today, it's likely that your unit would be: (a) very shortstaffed, (b) shortstaffed, (c) not shortstaffed, (d) slightly overstaffed, (e) greatly overstaffed
18. How stressed did you feel before your shift today? (a) much more than usual, (b) more than usual, (c) same as usual, (d) less than usual, (e) much less than usual
19. How much does going to work today interfere with activities going on at home? (a) not at all, (b) a little, (c) a great deal
20. Was this form completed on the day it is dated? (a) no, (b) yes

Rick D. Hackett received his Ph.D. degree in industrial-organizational psychology from Bowling Green State University. He is currently an assistant professor of human resource management at McMaster University in Hamilton, Ontario. His research interests include employee absenteeism, turnover, work attitudes, and employment equity.

Peter Bycio earned his Ph.D. degree in industrial-organizational psychology from Bowling Green State University. He is currently an assistant professor of management at Xavier University. His current research interests include the assessment center method, employee absenteeism, and turnover.

Robert M. Guion (Ph.D. Purdue University, 1952) is a Distinguished University Professor Emeritus at Bowling Green State University.

RESEARCH NOTES

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DIVERSIFICATION, SYSTEMATIC RISK, AND SHAREHOLDER RETURN: A CAPITAL MARKET EXTENSION OF RUMELT'S 1974 STUDY

MICHAEL LUBATKIN

University of Connecticut

RONALD C. ROGERS

University of South Carolina

This study reexamined the performance outcome of diversification strategies by combining the advantages of security-market-based measures and Rumelt's classification scheme. The findings underscore the popular, though weakly supported, belief that controlled diversity is associated with the highest performance. Specifically, firms that diversified in a constrained manner demonstrated significantly lower levels of systematic risk and significantly higher levels of shareholder returns than firms employing other strategies.

A widely held belief in strategic management is that firms that diversify in a related manner will perform better than firms that diversify in an unrelated manner. Rumelt first found empirical support for this relatedness prescription in a 1974 study. Subsequent strategic management studies, however, have uncovered results that either seriously question that study's adequacy (Bettis & Hall, 1982; Christensen & Montgomery, 1981) or provide at best weak statistical support for its findings (Palepu, 1985; Varadarajan & Ramanujam, 1987). Conversely, the general conclusion of research in financial economics has been that unrelated firms perform better than nonconglomerates (Michel & Shaked, 1984), or at least as well (Smith & Shreiner, 1969; Weston, Smith, & Shrieves, 1972).

There are at least three reasons to investigate further the belief that strategy influences corporate performance. First, strategic management studies have traditionally defined performance by some accounting-based index like return on assets. A recent review of the literature on corporate performance measures, however, developed a strong case for using measures based on security market returns and constructed from an equation called the capital asset pricing model (Lubatkin & Shrieves, 1986). The rationale is threefold: security-market measures explicitly partition the variability of a

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firm's returns, or risk, into its systematic and unsystematic components; only security-market measures directly reflect the viewpoint of common shareholders; and the well-documented measurement biases associated with accounting-based measures do not affect security-market measures. Second, although finance researchers have commonly employed security-market measures, they have classified corporate diversification strategies with a product-count index. Unlike Rumelt's classification scheme, which recognizes patterns of relatedness in marketing, distribution, R&D, and production, product-count indexes recognize only production-based similarities. Such indexes may, therefore, provide imprecise criteria for grouping firms into relatedness categories. Third, past studies examined return without explicitly accounting for risk. To the extent that risk and return act in concert to motivate diversification, a one-dimensional statistical test may understate the significance of diversification's contribution to corporate performance. No study has examined risk and return jointly as components of a two-dimensional measure of performance.

The present study extended past research efforts by combining the advantages of security-market measures and Rumelt's classification scheme. We employed a MANOVA design that simultaneously took into account the effects of corporate diversification on risk and on return.

PREVIOUS RESEARCH

The concept of corporate strategy as discussed by, among others, Rumelt (1974) and Porter (1985) provides guidelines for improving corporate performance. Two points are worth reviewing. First, a firm that achieves competitive advantage in its markets can better defend its chosen market positions against competitive and general economic forces. In other words, competitive advantage enables a firm to lower its systematic risk—defined as the sensitivity of a firm's returns to overall market risk—by forcing the burden of economic decline onto its weaker competitors. Also, competitive advantage helps a firm to amplify its returns during periods of market growth. Indirect support for this position comes from the economics literature, where the term market power is analogous to the term competitive advantage in that both imply a defensible market position. Economic studies have shown that as market power increases, systematic risk decreases (Moyer & Chatfield, 1983) and return increases (Logue & Merville, 1972).

A second point is that competitive advantage in any market is best achieved when a firm combines distinct business units that are linked by certain core technologies, a process that can be called constrained diversification. There are several mechanisms, identified in Table 1, that constrained diversifiers can use to make their business positions more competitive. In contrast, unrelated diversification offers far fewer mechanisms for that purpose. Although the mechanisms associated with unrelated diversification may provide financial economies (Williamson, 1975), they are less able to provide tangible and intangible efficiencies (Porter, 1985), collusive

TABLE 1
Summary of Predicted Advantages and Performance Outcomes

Influence Strategy	Tangible Interrelations	Intangible Interrelations	Multipoint Interrelations	Collusive Gains	Financial Synergies	Net Effect on Risk	Net Effect on Return
Single-business	Small advantage	Small advantage	Disadvantage	No advantage	No advantage	Neutral	Neutral
Dominant-vertical	Small advantage	Small advantage	Disadvantage	No advantage	No advantage	Neutral	Neutral
Constrained	Large advantage	Large advantage	Large advantage	Moderate advantage	Moderate advantage	Dampen	Amplify
Linked	Moderate advantage	Moderate advantage	Moderate advantage	Small advantage	Moderate advantage	Mildly dampen	Mildly amplify
Unrelated	Disadvantage	Disadvantage	Disadvantage	Disadvantage	Moderate advantage	Amplify	Dampen

gains (Chatterjee, 1986), and multipoint advantages (Wernerfelt & Karnani, 1985). Regarding the last, firms often compete in more than one industry, so actions taken in one industry may have implications in another. With multipoint competition, a firm may be forced to match its rival's economies in all of the rival's industries or face selective pockets of vulnerability. To the extent that unrelated diversifiers compete against firms with diversification strategies that provide the competitive mechanisms mentioned, the former will be at a competitive disadvantage. Stated differently, unrelated firms will show less advantageous risk and return properties.

Linked diversification, in which businesses that are related to at least one, but not all, of a firm's current activities are combined, represents a midrange position between constrained and unrelated strategies, and firms that make their strongest commitment to one business through either single-business or dominant-business vertical moves may be at a competitive disadvantage to all but unrelated firms (Lubatkin & O'Neill, 1987).

Table 1 summarizes the predicted competitive advantages associated with each diversification strategy and the net effect that the advantages have on systematic risk and shareholder return.

Existing empirical evidence on the relationship between corporate diversification and both systematic risk and shareholder return, however, is ambiguous. Recent studies have examined the relationship between diversification and systematic risk and found that unrelated diversifiers show higher levels of systematic risk than related diversifiers (Barton, 1988; Lubatkin & O'Neill, 1987; Montgomery & Singh, 1984). However, those studies have failed to consider possible trade-offs between risk and return. Corporate diversification may be undertaken to achieve multiple objectives like a decrease in risk and a decrease in returns, a trade-off that creates no value for common shareholders but may create value for the risk-averse agents of the shareholders. This condition may occur when compensation schemes fail to align the interests of management and shareholders (Tehrani, Traulos, & Waegel, 1987). Studies that examine systematic risk and shareholder returns jointly have tended to do so with product-count indexes of diversification and one-dimensional, risk-adjusted return statistics that may understate risk's significance (Dubofsky & Varadajan, 1987; Galbraith, Samuelson, Styles, & Merrill, 1986; Michel & Shaked, 1984; Weston et al., 1972). The present study examined risk and return both jointly, with a two-dimensional measure of performance, and singularly, and used Rumelt's classification scheme of diversification.

METHODS

Data and Firms

The firms studied appear on the list of firms used by Rumelt (1974). We chose firms from Rumelt's list because doing so allowed a direct comparison with his pioneering work and extension of his findings into market-based measures of risk and return. Moreover, Rumelt's list covers two decades (the

1950s and 1960s) of relative economic stability and avoids the more difficult period that began in the early 1970s with the energy crisis and ended in the mid-1980s with the softening of energy prices. The list also covers the 1940s, a decade that closed with high unemployment and high inflation, both brought about by the conversion from a wartime to a peacetime economy. Therefore, some results of the current study, particularly those from the 1950s and 1960s, may better represent the performance outcomes of current diversification efforts than do the results of studies that examined strategies of the more volatile years (e.g., Barton, 1988; Bettis & Hall, 1982; Christensen & Montgomery, 1981; Dubofsky & Varadarajan, 1987; Michel & Shaked, 1984; Montgomery & Singh, 1984).

The test firms for this study, however, differ from those used by Rumelt. He used a data base that provided annual observations from 1950 to 1970. Therefore, he was limited to examining strategy effects twice—once each for the decades beginning in 1950 and 1960. Further, his data base contained historical records only on firms still in existence in 1970, thereby raising the possibility of a survivorship bias embedded in his results.

In contrast, the current study employed the Center for Research in Security Prices (CRSP) data base, which does not delete data on firms that leave the New York Stock Exchange (NYSE). Consequently, our test group is not limited to firms still in existence in 1970. Further, because CRSP contains monthly rather than annual data, we could examine strategy effects over a shorter time frame—the final 40 to 60 months of each decade. To estimate reasonably stable coefficients from the market model, reviewing data from 60 months is desirable, though 40 months is adequate (Gonedes, 1973). Finally, the availability of data from before 1950 allowed us to examine strategy effects three times. A total of 121 firms are listed on CRSP for at least 40 consecutive months in the 1940s; for the 1950s, there are 135 such firms, and for the 1960s, 137. Overall, the test group contained 144 individual firms, of which 113 were present in all three time periods, 23 were present in two periods, and 8 were present in only one period. In 95 percent of the cases, 60 continuous months of data were available and therefore used.

Security-Market Measures

Depending on the availability of data, we estimated risk and return over the final 40 to 60 months of each decade, using the market model in the form $(r_{it} - r_{ft}) = a_i + b_i (r_{mt} - r_{ft}) + e_{it}$, where r_{it} is the monthly rate of return on the CRSP-value-weighted NYSE index for month t and r_{ft} is the yield on treasury bills one month before maturity. Estimates of b_i , or beta, represent the sensitivity of a firm's returns to the returns of the market; this is a measure of the firm's systematic risk. To facilitate comparisons between decades, we established market controls for estimates of systematic risk by calculating the value-weighted average beta of all NYSE-traded firms during the last 60 months of each of the three decades. A firm's beta in any decade

was then expressed as a percentage of its corresponding market beta; the market beta was 1.26 in the 1940s, 0.909, in the 1950s, and 1.23 in the 1960s.¹

Estimates of α_i , or Jensen's alpha (Jensen, 1968, 1969), represent the ability of a firm to perform better or worse than firms in an unmanaged portfolio of firms having similar market risk. Alpha is better suited to evaluate returns associated with strategies than are event-related measures of abnormal returns because strategies have no clear starting date (Montgomery & Wernerfelt, 1986). Rather, strategies tend to emerge as a series of related events. Each event, strategic or otherwise, results in a reassessment of value that is capitalized into a firm's stock price as the event becomes known to the marketplace. By construction, alpha is expected to capture the net impact of such events; it measures the extent to which a firm has surprised the market positively or negatively for an extended period of time. Further, by estimating alpha for a long period of time, the troublesome influence of an industry effect can be reduced. Fundamental to this assertion is the idea that industries are less likely than individual firms to surprise the capital markets. To demonstrate a positive or a negative alpha over a long time, therefore, a firm will have to act in an unexpected manner for its industry group. Finally, unlike beta, Jensen's alpha is by construction market-adjusted, and therefore no additional control is necessary.

Selecting the Relevant Horizon Length

A problem facing researchers is determining when measures of corporate performance reflect all strategy-related events. The current study defined the relevant time period as the final 40 to 60 months of each decade studied. This period should be adequate to capture long-term strategy effects with market measures because (1) such measures reflect investors' perceptions of future risk and return attributed to firm-specific events and (2) the events are by design those that led up to and include the point at which a firm's strategy type was determined, since Rumelt classified firms during the last year of each decade.

Many firm-specific events, therefore, are expected to contain information about a firm's strategy. Of course, just as many may be extraneous. This obvious shortcoming, however, need not invalidate the use of beta and Jensen's alpha for hypothesis testing. First, in large samples, the influence of extraneous events will be captured systematically to the extent that a strategy effect exists. Second, extraneous events bias results against finding statistical differences between categorical measures, thus promoting a conservative test.

¹ Our finding that the value-weighted NYSE beta is not equal to 1 is consistent with what Brown and Warner found and discussed (1980: 239–241).

Analyses

A MANOVA design was used to assess whether the different diversification strategies firms employed in each of the three decades studied significantly affected systematic risk and shareholder return, taken jointly. We then used univariate analyses of variance (ANOVAs) and Scheffé multiple range tests to test the importance of each of the two dependent financial variables in explaining any strategy effects. Finally, we again tested the research hypotheses using MANOVA and ANOVA and 393 observations obtained by pooling the data on firms in each strategy category for each decade.

Additional interpretation of the results was obtained by using chi-square tests to compare the distribution of strategy types across the range of the firms' performance. The following steps were taken to construct these tests: First, we defined performance by a modified Jensen's measure, or the ratio of alpha to beta (Weston et al., 1972); this univariate, risk-adjusted return measure is a unit of extra-market return per month, per unit of stockholder risk. Using this measure, we developed a high-to-low performance ranking for each decade. Each ranking was then partitioned to distinguish value creators, defined as firms that demonstrated the ability to outperform the marketplace over a period of about 60 months, from value destroyers—firms with a negative modified alpha. We also developed a three-decade ranking by combining the rankings across decades. Finally, individual chi-square tests were run to compare the distribution of each strategy type among the value-creating and value-destroying firms for the pooled sample and for each of the three-decade subgroups.

RESULTS

Table 2 displays the measure of mean, market-adjusted systematic risk (beta) and the measure of security-market return (alpha) for each of the five strategy types for each of the three-decade subgroups and the pooled sample. A MANOVA model provides strong support for the assertion that performance differences existed over the range of strategy categories ($p < .01$) for all but the 1940s group. Recall that the mid-to-late 1940s was a time when the economy was making the difficult adjustment from war to peace, thereby likely making corporate strategy more problematic. The individual ANOVAs on risk and return suggest that most of the explained variance attributed to strategy comes from its influence on systematic risk: the ANOVA F is significant to the .001 level for all but the 1940s. A Scheffé test of multiple comparisons on mean systematic risk by strategy groups (not shown in Table 2) suggests that at least two categorical comparisons, constrained and dominant-vertical, and single-business and dominant-vertical, are significantly different at the .05 level for the 1950s subgroup. Similarly, the Scheffé test suggests at least two significant categorical differences (constrained and unrelated, and dominant-vertical and unrelated) for the 1960s, and at least two

differences (constrained and unrelated, and single-business and unrelated) for the pooled data.

Of course, the analyses shown in Table 2 focus on group means and may not reveal a complete pattern of performance differences. Table 3, therefore, presents the distribution of strategy types across the value-creating and value-destroying partitions and the corresponding chi-square statistics for each of the three decades and the pooled data.

The results concerning constrained strategies are fully consistent with those presented in the previous table. Firms that followed constrained strategies appeared much more likely to be value-creators than value-destroyers, with chi-squares significant to at least the .01 level for all but the 1940s. In contrast, firms that followed the other four strategy types were equally distributed among the subgroups defined by the value-creation partitions. Upon

TABLE 2
Mean Systematic Risk and Capital Market Return by Strategy Groups^a

Decades ^b	Single-business	Dominant-vertical	Constrained	Linked	Unrelated	F ^c
1940s						
N	37	18	49	14	3	
Beta	0.95 (.28)	0.95 (.36)	0.92 (.24)	0.98 (.25)	1.07 (.29)	0.3
Alpha	0.06 (.81)	0.06 (.55)	0.04 (.91)	-0.10 (.64)	-0.36 (.63)	0.3
F ^d _{8,230} = 0.25						
1950s						
N	16	19	62	28	10	
Beta	0.93 (.39)	1.42 (.38)	1.01 (.37)	1.11 (.50)	1.18 (.30)	4.7***
Alpha	0.08 (.94)	0.31 (.67)	0.59 (.68)	0.33 (1.3)	0.11 (1.1)	1.5
F ^d _{8,258} = 3.01**						
1960s						
N	6	24	46	41	20	
Beta	0.80 (.29)	0.82 (.31)	0.93 (.32)	1.00 (.29)	1.21 (.31)	5.1***
Alpha	0.02 (.66)	0.33 (.73)	0.51 (.65)	0.37 (.83)	0.40 (.72)	0.8
F ^d _{8,262} = 2.84**						
Three decades						
N	59	61	157	83	33	
Beta	0.93 (.31)	1.05 (.43)	0.96 (.32)	1.03 (.37)	1.19 (.30)	4.3***
Alpha	0.06 (.82)	0.24 (.67)	0.40 (.78)	0.27 (1.0)	0.24 (.86)	1.9
F ^d _{8,754} = 2.50**						

^a In each cell, the first number is the mean performance statistic. The number in parentheses is the cross-sectional standard deviation of the mean.

^b In all cases, systematic risk (beta) is expressed as a percentage of market risk, as determined by the beta of the average NYSE-traded firm. Stockholder return (alpha), defined as the monthly performance above or below an unmanaged portfolio of firms with similar risk, is expressed as a percentage and empirically represented by Jensen's alpha.

^c Values are ANOVA-based.

^d Values are MANOVA-based.

** $p < .01$

*** $p < .001$

TABLE 3
Distribution Across Diversification Categories of Value Creators
and Value Destroyers by Decade

Decades	Diversification Strategies				
	Single-business	Dominant-vertical	Constrained	Linked	Unrelated
1940s					
Creators	19	11	29	5	1
Destroyers	18	18	20	9	2
χ^2	0.03	0.89	1.65	1.14	0.33
1950s					
Creators	7	12	53	15	5
Destroyers	9	19	9	13	5
χ^2	0.25	1.32	31.20***	0.14	0.00
1960s					
Creators	3	14	34	26	14
Destroyers	3	24	12	15	6
χ^2	0.00	0.67	10.50**	3.43	3.20
Three decades					
Creators	29	37	116	46	20
Destroyers	30	24	41	37	13
χ^2	0.02	2.77	35.80***	1.19	1.48

** $p < .01$

*** $p < .001$

closer examination of the pooled data distribution (not presented in the table), however, linked and dominant-vertical firms showed patterns that departed from the expected. In the cases where these two strategies destroyed stockholder value, they did so in a big way: 10 out of the 13 value-destroying unrelated firms were included in the bottom half of the value-destroying subgroup, as were 21 of the 24 value-destroying dominant-vertical firms. The chi-square results and the descriptive performance rankings therefore highlight the dangers of generalizing from group means.

In summary, the pattern of performance differences illustrates that constrained strategies were the top performers, outperforming the marketplace by a three-decade average of .0058 per month per unit of systematic risk (i.e., alpha divided by market-adjusted beta). Stated differently, firms that adhered to constrained strategies created shareholder value in that their risk-adjusted returns were 35 percent higher than those of other firms in the market over a 60-month period. Overall, vertical strategies had the lowest return-risk rating (.0001 per month). In contrast, unrelated strategies were associated with the highest levels of risk, but also with moderate levels of return. Overall, unrelated strategies showed a .0023 monthly return-risk rating. Therefore, when return and risk are considered in tandem, unrelated strategies do not appear to perform worse than the market average. The same is true for linked and single strategies (.0017 per month). The findings for unrelated strategies represent a major departure from Rumelt's findings.

DISCUSSION AND CONCLUSIONS

This study attempted to combine the advantages of a strategic perspective on corporate diversification and security-market based measures of risk and return. As expected, firms that diversified into unrelated product markets tended to show higher levels of systematic risk than firms employing the other strategy types. In contrast, firms that diversified in a controlled manner demonstrated superior risk properties. These findings extend Rumelt's (1974) findings. He observed that firms diversifying in a constrained manner had lower variability in earnings than did firms that employed other strategy types because the first firms were "diverse enough to compensate for declining prospects in one product-market area with new products that are functional substitutes for the old product" (1974: 104). However, Rumelt also stated, "Such firms are not so diversified that they can avoid the total systematic risk of the economy" (1974: 104). The findings of the present study suggest that Rumelt may have underestimated the value of controlled diversity in mitigating economic risk. Although no strategy can fully eliminate systematic risk, constrained strategies demonstrate the ability to manage away a portion of it.

The findings of the present study also complement the findings of Barton (1988) and of Montgomery and Singh (1984) because the mean betas presented in the three studies are similar, although the economic environments are not. This similarity suggests that the conclusions of the present study should apply to other time periods, even the turbulent 1970s.

Finally, the systematic risk findings are important because they suggest that constrained strategies can achieve a reduction in risk that stockholders cannot achieve on their own. This finding therefore underscores the distinction between managing a portfolio of securities and managing a portfolio of businesses. In the latter case, the systematic variance of the combined returns of each business need not be a linear extension of historical variances. Rather, management actions may alter the underlying risk profiles of the combining businesses. In instances of corporate diversification, therefore, general market risk appears to have an uncontrollable and a controllable component. Lubatkin and O'Neill (1987) studied merger strategies and arrived at similar conclusions.

Of course, low systematic risk is valuable to stockholders only to the extent that it is not accompanied by a corresponding low return. The robust evidence presented by the current univariate analysis of Jensen's alpha and systematic risk, multifaceted analysis of the two, and chi-square analysis using a modified Jensen's measure, however, strongly suggests that a well-devised strategy can simultaneously yield low risk and high returns. Further, the findings of the current study clearly show statistical grounds for asserting that performance differences exist over the range of strategy categories. Finally, the current findings underscore Rumelt's findings that constrained diversification leads to the highest performance and also extend his findings to security-market-based measures.



This study has limitations, however. For example, we did not explicitly control for other influences, such as monopoly power, that might be driving the results. Unfortunately, the effects of strategy and power may not be separable. Power may derive from monopolistic positions that have little to do with strategy; conversely, power may also emanate from several mechanisms that, as shown in Table 1, are theoretically linked to strategy. Adding to the complexity of controlling for monopoly power is that existing measures are at best "imperfect representations of an unobservable construct" (Barton, 1988: 368). Confronted with these construct issues, we made the arguable assumption that any influence of monopoly power would not be systematically present in the firms studied.

Questions emerge from the findings of this study. Why does vertical integration either create shareholder value or destroy it in a big way? What discriminates firms that retain one diversification strategy over two decades from firms that change to a new one? Is controlled diversity the cause of high performance? Or, as Rumelt conjectured, "Is it rather that high performance eliminates the need for greater diversification?" (1974: 125). Will risk and return characteristics improve for firms that adopt a constrained strategy but decline for firms that move away from one?

In summary, this study extends the literature on diversification strategy and economic performance and in the process makes a contribution by replicating Rumelt's 1974 study with security-market measures of risk and return. Longitudinal analyses of diversification decisions would seem to be the next important area of investigation.

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Michael H. Lubatkin is an associate professor of business policy at the University of Connecticut. He obtained his doctorate from the University of Tennessee. His current research interests include corporate diversification, capital markets, mergers, and leadership.

Ronald C. Rogers is an associate professor of finance at the University of South Carolina. He obtained his doctorate from Ohio State University. His current research interests include capital markets, corporate finance, and diversification.

ATTRIBUTIONS AND EXCHANGES: THE EFFECTS OF INTERPERSONAL FACTORS ON THE DIAGNOSIS OF EMPLOYEE PERFORMANCE

ROBERT L. HENEMAN
DAVID B. GREENBERGER
CHIGOZIE ANONYUO
Ohio State University

A study was conducted with 188 supervisors to assess the relationships among supervisory attributions, the exchange relationship between leaders and subordinates, and critical performance incidents. The results indicated that internal, but not external, attributions were significantly related to the leader-member exchange and to critical performance incidents. We discuss the implications of these findings.

Green and Mitchell (1979) set forth a two-stage model of leadership based on attribution theory. They proposed that in the first stage, performance by subordinates leads to the formation of attributions by their leader. Leaders may attribute subordinate performance to internal causes like ability and effort or to external causes like luck and task difficulty. In the second stage, these attributions produce different leader behaviors toward subordinates. A number of empirical studies have provided support for the second stage of the model. For example, attributions by leaders have been shown to be related to discipline and reward decisions (Green & Liden, 1980; Lanzetta & Hannah, 1969; Mitchell & Wood, 1980; Weiner & Kukla, 1970) and to selection decisions and task assignments (Hargrett, 1981).

Limited empirical support also exists for the first stage of the model. It has been shown that attributions do covary with subordinate performance (Knowlton & Mitchell, 1980; Mitchell, Green, & Wood, 1981). However, the formation of attributions by leaders may be associated not only with subordinate performance but also with the nature of the relationships between the leaders and subordinates. Green and Mitchell (1979) first mentioned the possibility of such a relationship eight years ago, and although several authors have subsequently mentioned it (Dienesch & Liden, 1986; Mitchell et al., 1981), no one has fully described or empirically tested this relationship.

This article presents an empirical test of the relationship between attri-

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bution formation and leader-subordinate relationships. We conceptualized attributions as a function of both the exchange relationships that supervisors have with their subordinates and levels of subordinate performance. The nature of the exchange relationships in question can be defined by leader-member exchange theory, an extension of vertical dyad linkage theory. According to this theory, leaders differentiate employees into two sets, an ingroup and an outgroup (Dansereau, Graen, & Haga, 1975; Dienesch & Liden, 1986; Graen & Cashman, 1975; Graen, Novak, & Sommerkamp, 1982). Supervisors offer subordinates in an ingroup a high degree of trust, interaction, support, and rewards, whereas outgroup subordinates receive a low degree of trust, interaction, support, and rewards.

Our expectation was that when supervisors assign causality to subordinates' performance, they may provide more favorable attributions to ingroup members than to outgroup members when the performance levels of the ingroup and outgroup members are the same. Leaders will attribute effective performance by subordinates to internal factors and ineffective performance to external causes for ingroup members. These attributions are favorable to ingroup members because they may lead to rewards like incentive pay, and they are also favorable to supervisors because they support their cognitive association with ingroup members (Wilder, 1986). Alternatively, we expected that leaders will attribute effective performance to external causes and ineffective performance to internal causes for outgroup members.

Leaders may make these attributions for a variety of reasons. First, they may see ingroup members as "hedonically close" to themselves, so the attributions leaders form for an ingroup may be similar to self-attributions.¹ Second, abundant research (e.g., Brewer, 1979; Wilder, 1986) has indicated that individuals have overall favorable images of the members of ingroups and unfavorable images of the members of outgroups. Specifically, because individuals are more receptive to information that is consistent with their categorizations of ingroup and outgroup, supervisors may recall evidence that supports these biases but may not perceive evidence that could contradict them. Third, in order to maintain a high degree of trust between themselves and ingroup members, leaders may need to give preferential treatment to ingroup members (Graen, 1976).

In sum, previous research suggests that leaders will make favorable attributions for ingroup members but not outgroup members. We therefore hypothesized that (1) when performance is effective, internal attributions—to ability and effort, for example—will be higher for ingroup than for outgroup members, and external attributions (to luck and difficulty) will be higher for outgroup members than for ingroup members; (2) when performance is ineffective, internal attributions will be higher for outgroup members than for ingroup members, and external attributions will be higher for ingroup members than for outgroup members.

¹ Thanks to an anonymous reviewer for this suggestion.

METHODS

Design and Data

The respondents were 188 supervisors employed in 37 organizations. All the organizations were in the same large metropolitan area. There were more men than women (112 vs. 76) among the respondents. Their average age was 39 years; average tenure in their present organization was nearly 9 years; and average tenure as a supervisor was nearly 6 years. Small cell sizes precluded the use of supervisors' or subordinates' gender as a control variable.

To test the hypotheses, we used a 2×2 within-subjects design. The first factor, exchange relationship, had two levels: ingroup and outgroup status. The second factor, performance in a critical incident,² also had two levels—effective and ineffective. Attributions of ability, effort, luck, and task difficulty served as the dependent variables.

Manipulations and Measures

Exchange relationship. We assessed ingroup status by asking the supervisors to think of the subordinate with whom they had best working relationship. This person was defined as the single individual "from whom you would most likely welcome suggestions, who you would most likely assist if they have a problem, who you would most likely to turn to when you have a problem, and who you most likely depend upon to get things done." Outgroup status was assessed by asking the supervisors to think of another subordinate with whom they had the worst working relationship. This person was further identified as the individual "from whom you would most likely not welcome suggestions, who you would most likely not assist if they have a problem, who you would most likely not turn to when you have a problem, and who you most likely do not depend upon to get things done." Duchon, Green, and Taber used a similar measure of exchange relationships, stating that "best and worst were characterized in terms of behavioral dimensions derived from previous work using quality of exchange measures" (1986: 56) (cf. Liden & Graen, 1980; Schieman & Graen, 1978). For two time periods, Duchon and colleagues reported significant correlations of .42 and .35 for relationships between their measure of exchange relationships, similar to the one used in the present study, and the quality of exchange. These data suggest that measures of exchange relationships and of quality of exchange are convergent with one another (Duchon et al., 1986).

Critical incidents. Supervisors generated a critical incident in which performance was effective and a critical incident in which performance was ineffective for both the ingroup and outgroup member chosen. Hence, there was a critical incident for each cell in the 2×2 design. Effective perfor-

² Critical incidents are occurrences of highly effective or highly ineffective behaviors in performing a job (Flanagan, 1954).

mance was established by asking the supervisors to think of a situation in which a subordinate's performance exceeded the expected performance standard of his or her position, and ineffective performance was established by asking them to think of an incident when the subordinate's performance fell below the performance standard of his or her position.

Attributions. For each of the four conditions generated by the two-factor design, supervisors were asked to indicate the extent to which each of the following caused the incident: ability, effort, luck, and task difficulty. The four choices coincide with the four dimensions suggested by Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum (1971). To assess the degree to which supervisors attributed subordinate performance to each of the four dimensions, we used four 1-item measures with 5-point scales ranging from "very little" to "very much"; a high score indicated that the particular attribution was a likely cause of the incident.

Procedures

Each supervisor completed a questionnaire for both the ingroup and the outgroup subordinate. For each subordinate, the supervisor thought of an effective or ineffective critical incident and completed attribution ratings of the subordinate for that incident. Then, we asked the supervisor to think of a critical incident unlike the one already rated—effective if the first was ineffective, and vice-versa—and to make attribution ratings of the same subordinate for this incident. Finally, the supervisor gave performance ratings and some demographic characteristics for the subordinate. The same procedure was then followed for the other subordinate. We presented both the ingroup-outgroup status and effective-ineffective performance manipulations in counterbalanced order. Thus, each supervisor provided one set of attribution ratings for each of the four conditions in the experiment: ingroup member-effective performance, ingroup member-ineffective performance, outgroup member-effective performance, and outgroup member-ineffective performance.

Analysis

A 2×2 within-subjects analysis of variance (ANOVA) was conducted four times, with ability, effort, luck, and task difficulty as the dependent variables. The two factors were critical incidents and exchange relationships. We calculated effect sizes using omega squared (ω^2). When the interaction between a critical incident and an exchange relationship was significant, we conducted Scheffé a posteriori comparisons on the appropriate means to test for significant differences in attributions (Kirk, 1982).

RESULTS

Table 1 presents the means and standard deviations and Table 2 the correlations for the causal attribution variables. Table 3 presents the univariate ANOVA results. For all but one of the dependent variables, signifi-

TABLE 1
Means and Standard Deviations for Causal Attribution Variables^a

Attributions	S ^b	Critical Incidents			
		Effective		Ineffective	
		Ingroup	Outgroup	Ingroup	Outgroup
Ability	.35	4.20 (0.78)	3.46** (0.85)	2.09 (1.04)	2.60** (1.11)
Effort	.39	4.22 (0.74)	3.41** (1.03)	2.75 (1.28)	3.47** (1.30)
Luck	.23	1.77 (0.86)	2.00 (0.99)	1.73 (0.92)	1.77 (0.97)
Task difficulty	.34	3.07 (1.01)	2.94 (1.03)	2.95 (1.13)	2.58 (1.09)

^a N = 181; standard deviations are in parentheses.

^b Critical values (where $p < .05$) are for Scheffé S a posteriori comparisons of ingroup and outgroup status.

* $p < .05$

** $p < .01$

cant main effects emerged for both exchange relationship and critical incidents. The type of exchange relationship failed to have an effect on the perceived effort of the subordinates. A significant interaction was found for all but one of the dependent variables, task difficulty.³

Table 1 also shows the results of the a posteriori comparisons for Hypotheses 1 and 2. Hypothesis 1 concerned the attributions for effective performance. As can be seen, we found significant differences between mean attributions for ingroup and outgroup members for both internal attributions. Ability was significantly higher for ingroup than for outgroup members; effort was significantly higher for ingroup than for outgroup members. In both cases, supervisors were more likely to attribute effective performance to internal factors for ingroup members than for outgroup members. The results were not significant when supervisors were asked to make external attributions. A nonsignificant difference emerged between mean attribution ratings of luck for ingroup and outgroup members. Because the interaction of exchange relationship and critical incident was not significant, we did not calculate comparisons for the attributions to task difficulty.

³ An anonymous reviewer suggested that the exchange relationship factor might have been confounded with the overall performance levels of individual ingroup and outgroup members. In order to assess this possibility, we conducted a dummy variable regression analysis for each of the four dependent variables, entering a nine-item composite measure of overall performance ($\alpha = .81$) in the regression equation first. Subsequently, we entered the other independent variables: critical incident, exchange relationship, and the interaction of critical incident and exchange relationship. After overall performance had been controlled for, the hypothesized interaction was significant ($p < .05$) for ability and for effort; the interaction was not significant for luck and difficulty. Thus, the interaction was confirmed for the two internal attributions, even after the variance due to overall performance had been removed.

TABLE 2
Correlations for Attributions by Exchange Relationship
and Critical Incident^a

Variables	1	2	3	4
Ingroup status				
1. Ability		.12	.13	.21
2. Effort	.12		.13	-.18
3. Luck	-.06	-.18		.10
4. Task difficulty	.12	.01	.22	
Outgroup status				
1. Ability		-.16	-.04	.45
2. Effort	.19		-.13	-.09
3. Luck	.04	-.11		.03
4. Task difficulty	.06	.10	.23	

^a N = 182 for the top matrix and 181 for the bottom matrix; the top diagonal of each matrix represents correlations for ineffective critical incidents; the bottom diagonal represents correlations for effective critical incidents.

Hypothesis 2 concerned the attributions for ineffective performance. As Table 1 indicates, there were significant differences in the attributions between ingroup and outgroup members for both internal attributions. Attributions of ability were significantly higher for outgroup members than for ingroup members. Attributions of effort were also significantly higher for outgroup members than for ingroup members. Thus, supervisors were more likely to make internal attributions for the ineffective performance of outgroup members than for the ineffective performance of ingroup members. In contrast, the results for external attributions did not turn out as expected. There was a nonsignificant difference between the mean ratings of luck for ingroup and outgroup members. We did not conduct comparisons for task difficulty because the interaction between exchange relationship and critical incident was nonsignificant.

DISCUSSION

The results of the present study suggest that supervisors make internal attributions that are consistent with the perceived status of their subordinates as ingroup or outgroup members. Internal attributions were significantly higher for ingroup members than for outgroup members when performance was effective. Internal attributions were significantly higher for outgroup members than for ingroup members when performance was ineffective. Supervisors appear to be less consistent in assigning external attributions to ingroup and outgroup members than they are in making internal attributions. None of the mean differences in external attributions were significant.

These results have two implications for the development of the Green and Mitchell (1979) model. First, consistent with previous suggestions (Green & Mitchell, 1979), these findings show that the nature of an exchange

TABLE 3
Results of Univariate ANOVAs for Causal Attribution Variables

Variables	Ability			Effort			Luck			Task Difficulty		
	Means	F ^a	ω^2	Means	F ^a	ω^2	Means	F ^a	ω^2	Means	F ^a	ω^2
Exchange relationship	.22	4.05*	.01	0.54	0.58	.00	2.96	5.51*	.01	11.95	11.27**	.03
Critical incident	.82	343.93**	.48	90.02	66.78**	.15	2.96	7.56**	.02	10.45	12.78**	.03
Interaction	.80	75.71**	.23	106.16	92.01**	.27	1.61	3.89*	.02	2.55	2.89	.00

^a $df = 1,181$.

* $p < .05$

** $p < .01$

relationship does indeed influence the formation of attributions by a leader. Specifically, the exchange relationship is related to the assignment of internal attributions. Thus, in stage 1 of Green and Mitchell's model, we might now include exchange relationship as well as subordinate performance level as a determinant of attributions by supervisors.

Second, the exchange relationship variable did not substantially contribute to a better understanding of the formation of external attributions. The interaction between exchange relationship and critical incident was nonsignificant for task difficulty. Although the interaction was significant for luck, the amount of variance accounted for was small ($\omega^2 = .02$), and the results of a posteriori comparisons for luck were nonsignificant. Thus, the pattern of results for external causes remained somewhat random, even when we considered exchange relationship. These data suggest that type of attribution may bound the application of leader-member exchange theory to the Green and Mitchell model.

Three post-hoc explanations may account in part for the lack of significant differences in external attributions between ingroup and outgroup members. First, one of the external factors, luck, is ambiguous, difficult to observe, and perhaps not directly linked to an individual employee's performance. As a consequence, it may have been difficult for supervisors to rate this item for both ingroup and outgroup members. Second, previous research has shown that supervisors tend to make more internal than external attributions for behaviors that produce major rather than minor consequences (Fiske & Taylor, 1984). In the present study, supervisors were asked to think of critical performance incidents. These critical incidents may have greater consequences than routine incidents. The consequences associated with critical incidents may have led supervisors to give more careful consideration to internal than to external attributions. In turn, this more careful assessment of internal attributions may have produced significant differences for internal attributions but not for external attributions. Third, research indicates that people with a high internal locus of control tend to be found more often in managerial positions than in subordinate positions (Valecha, 1972). As a result, managers may be more familiar with internal attributions than with external attributions. The managers in the present study may have been able to differentiate more easily between ingroup and outgroup members for internal attributes than for external attributes because of their familiarity with internal attributions.

The present results also have implications for future research and practice. Clearly, more research is needed to understand the psychological processes whereby supervisors form attributions. The data in the present study did not allow for the testing of some explanations—hedonistic closeness, for instance—that could be advanced to explain why exchange relationships influence attributions. Also, additional research is needed to explain the pattern of results for external attributions. The present study raises questions about the extent to which leader-member exchange theory contributes to an understanding of external attributions. Future research might use cognitive

theories (e.g., Feldman, 1981) to explain the pattern of results for external attributions. Our findings suggest that at least one external factor, luck, may be too ambiguous to allow the making of meaningful distinctions between ingroup and outgroup members.

In terms of practice, these data suggest that leaders assign internal attributions and subsequent behaviors not only on the basis of subordinate performance, but also on the basis of ingroup and outgroup status. To the extent that group status does not reflect actual performance, the potential exists for leaders to treat high performers unfavorably and low performers favorably. The training program for developing leadership skills on the basis of the attributional model of leadership developed by Mitchell and colleagues (1981) may be useful for preventing that from happening.

This study should be viewed in the context of a number of potential limitations. First, we defined exchange relationships between supervisors and subordinates by a dichotomous measure of ingroup and outgroup membership. As a result, it was not possible to assess the reliability and validity of this measure. However, previous research (Duchon et al., 1986; Vecchio & Gobdel, 1984) has shown that this dichotomous measure of exchange relationships correlates significantly with the more frequently used quality-of-exchange measure (e.g., Schieman & Graen, 1978). We did not use the more common measure in the present study because of time and space constraints in the administration of the questionnaire.

Second, attributions were measured with single items. The intercorrelations among the single-item measures of internal and external attributions were low, as attribution theory would predict. Unfortunately, these low interitem correlations may have been due to the unreliability of single-item measures. Although research on attribution has commonly used single-item measures, they present problems in testing the reliability and validity of a construct. Multiple-item measures of attributions have been developed (e.g., Porac, Ferris, & Fedor, 1983), but their measurement properties are also somewhat suspect. For example, Porac and colleagues found that internal and external attributions were highly intercorrelated, which runs contrary to attribution theory. In the present study, it was not possible to develop a new multiple-item measure, given the time constraints governing questionnaire administration.

Third, the within-subjects design used in this study creates opportunities for response bias, demand effects, and common method variance. Response bias may have occurred because supervisors were asked to recall specific performance incidents. However, this bias may not be severe, as research on memory suggests that supervisors are more accurate in recalling specific incidents than they are given credit for in schematic theories of memory (Alba & Hasher, 1983). In order to minimize demand effects, we presented the exchange relationship and critical incident manipulations in counterbalanced order. Although it would have been desirable to gather data from a third party to provide a manipulation check to minimize common method variance, it was not possible to do so. If data had been collected from

additional sources, the anonymity of the supervisors and employees who participated in the study would have been breached.

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Robert L. Heneman received his Ph.D. degree in labor and industrial relations from Michigan State University. He is currently an assistant professor in the Faculty of Management and Human Resources at the Ohio State University. His research interests are in the areas of performance appraisal and compensation.

David B. Greenberger received his Ph.D. degree in social psychology from the University of Wisconsin-Madison. He is currently an associate professor of management and human resources at the Ohio State University. His research interests include personal control in organizations, group behavior, leadership, and psychological factors in new venture initiation.

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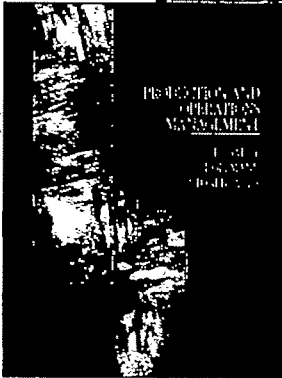
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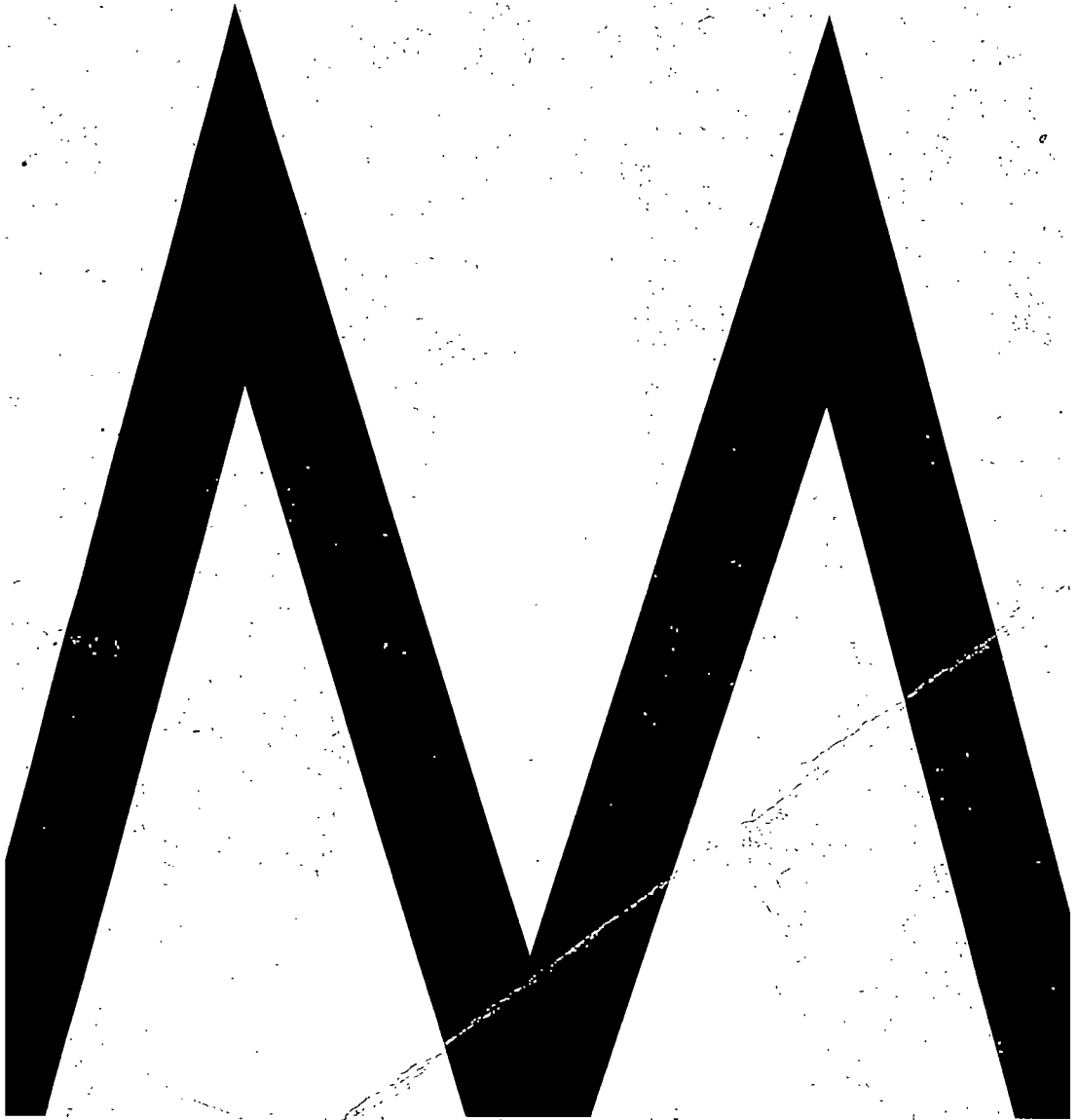
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Submissions should be sent to Professor Richard T. Mowday, *Academy of Management Journal*, College of Business Administration, University of Oregon, Eugene, Oregon 97403-1208.

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FROM THE EDITOR

Reporting Research

Publication of a paper in *AMJ* is for most authors the culmination of several years of hard work. Developing theoretical arguments, formulating research designs, and collecting data are time-consuming processes. Moreover, the rigors of the review process are such that authors are usually asked to revise their paper several times and often must reanalyze their data. For these reasons, if not others too obvious to mention, the acceptance of a paper for publication is cause for celebration.

Although getting published is a notable accomplishment, it should not become an end in itself. We seek publication of our work in hopes of contributing to knowledge about management. What is the end of a cycle for one researcher may be the beginning of a cycle for others. If we study important problems and obtain insightful findings, we can shape how people think about management and influence the direction of our colleagues' work.

Since published research plays such an important role in shaping management research and practice, it is critical that it be reported as comprehensively and accurately as possible. Misleading or inaccurate reporting detracts from the knowledge base of the field. In addition, it can set our colleagues off on false research leads, thus wasting valuable resources and ultimately producing little in the way of useful knowledge.

An important goal of the manuscript review process is to help authors report their research methods and findings fully and accurately. Readers often become impatient when crucial details are omitted, so reviewers are encouraged to insist that authors give complete accounts, particularly when the methods used are new or innovative. Comprehensive reporting is necessary not only to fully evaluate a work, but also to help other researchers replicate it.

The importance of reporting research accurately cannot be stressed too highly. In thinking back over new submissions to the *Journal*, however, it is disconcerting to note how many papers we receive have inaccuracies and errors. The most obvious are miscitations to the literature, inaccurate interpretations of the work of others, and simple grammatical and spelling errors. One likes to think that similar problems do not exist in reporting the actual results of data analyses, although this is difficult to know for sure. Unless the errors are grievous, inaccurate reporting of research results often can only be determined by the author and thus remains virtually undetectable in the review process.

In the course of the many steps involved in publishing a paper, the *Journal* makes every effort to increase the accuracy of what is published. Papers are reviewed several times by subject matter experts, extensively copy-edited, and proofread by the editor and production editor. In fact, it is no exaggeration to say that the average paper we publish is read fifteen times before it appears in print.

Even with such an extensive review process, it is still possible for errors to find their way into print. Although the *Journal* staff will continue to make every effort to ensure the accuracy of the papers we publish, the ultimate responsibility for accuracy rests with the author whose name appears on the work. Moreover, it is the reputation of the author that is most likely to suffer from careless mistakes and inaccuracies. Simple errors, seemingly inconsequential in themselves, can cast doubt in the minds of readers about the care taken in conducting the research, thereby diminishing its broader influence on the field.

One of my colleagues, Alan Meyer, advises doctoral students and young faculty members to be compulsive about craftsmanship in preparing papers for publication. It is sage advice. Reviewers often find it difficult to take a piece of work seriously when it appears the author has not done so. Before a paper is ever submitted for publication, it should be checked for accuracy and checked again. Having colleagues review a paper prior to submission is often an excellent way to detect problems, although it is not always sufficient. Accuracy is simply too important to rely solely on others. Authors have to be committed to, and compulsive about, accuracy in reporting their work.

Simultaneous Submissions

Almost everyone understands that it is inappropriate to simultaneously submit a paper for publication to more than one journal. Judging from several telephone calls I received last fall, however, there appears to be some confusion about the simultaneous submission of papers to the annual meeting of the Academy and to the *Journal*. Since many readers are now preparing papers for submission to the next annual meeting, it may be useful to clear up the ambiguity.

The source of the confusion for some appears to be a statement appearing in the Call for Papers for the annual meeting: "Submissions should be entirely original and must not be under concurrent consideration or scheduled for presentation elsewhere."

The intent of this statement is to prevent the same paper from being presented at more than one meeting or from being presented at the meeting after it has appeared in a journal. It is not meant to suggest that a paper submitted to the meeting cannot be simultaneously submitted to the *AMJ* for publication. The length of the manuscript review process and the publication lag for accepted papers suggests there is little likelihood that such a paper would appear in *AMJ* before it is presented at the meeting.

Although there is nothing wrong with simultaneously submitting the same paper to the meeting and to the *AMJ*, it is not always in the author's best interests to do so. Let me explain why.

The page limitations associated with submission to the meeting (21

pages) are far more strict than those for the *Journal* (30 pages). It is therefore possible to submit a paper to the *Journal* that more comprehensively develops theoretical ideas and reports the research in greater detail. This is one reason why the *Journal* is willing to consider papers that have been invited to appear in the *Proceedings* of the meeting. Because the *Journal* encourages more comprehensive reporting, we expect any paper we publish to be substantively different from the one appearing in the *Proceedings*.

Another reason for not simultaneously submitting a paper is that authors often receive valuable feedback on their work from the meeting review process and from presenting their ideas to a scholarly audience. Incorporating this feedback into the paper prior to journal submission can strengthen it considerably and enhance its chances for eventual publication.

In short, simultaneous submission of the same paper to the meeting and to the *AMJ* does not violate professional norms, at least not that I am aware of. However, I caution contributors against doing so. Use every opportunity to solicit feedback on your work prior to submission to the *Journal*. Moreover, take advantage of the extra pages the *Journal* allows to more fully report your research. This is not to say that papers submitted to the *Journal* should be longer than they need to be. Instead, it reflects the fact that papers submitted to the meetings are often required to be shorter than they should be.

Taking advantage of every opportunity to strengthen your work prior to submission to the *AMJ* will increase its chances for eventual acceptance and publication.

RTM

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STRATEGIC CHANGE: THE EFFECTS OF FOUNDING AND HISTORY

WARREN BOEKER
Columbia University

The research reported here examined the evolution of strategy over time and the conditions under which change in strategy is likely. Findings show that characteristics of an organization's founding imprint its initial strategy by contributing to an internal consensus around a given strategic approach. Conditions subsequent to founding also influence the degree to which an initial strategy is perpetuated. The study examined perspectives on organizational change and inertia and further developed them to explain the role of history and precedence in shaping strategic action.

The evolution of organizational strategy and the extent to which strategy is amenable to change are issues of central interest to strategy theorists (Mintzberg & Waters, 1982; Schendel & Hofer, 1979). Despite extensive debate in the literatures of organizational theory and strategic management over the extent to which organizations can be characterized as possessing inertial or adaptive tendencies (Hambrick & Finkelstein, 1987; Hannan & Freeman, 1984; Singh, House, & Tucker, 1986; Tushman & Romanelli, 1985), little empirical work has examined organizational inertia or adaptation within the context of strategic change. This study explored the relative usefulness of inertial and adaptive views of organizations by examining the evolution of strategy over time and the conditions under which change in strategy occurs.

THEORY DEVELOPMENT AND HYPOTHESES

Organizational researchers seem to vary rather widely in the extent to which they view organizations as adaptive or inertial. Although there has been some convergence of the two views in recent years (Hambrick & Finkelstein, 1987; Tushman & Romanelli, 1985), the assumptions underlying each perspective are quite distinct (Scott, 1981; Singh et al., 1986). Within the field of strategy, two similarly distinct perspectives characterize theory and

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research on strategic change. Those who argue for the predominance of *strategic choice* emphasize the role that managers play in monitoring environmental changes and modifying organizations' strategies to match those changes better (Andrews, 1971; Child, 1972; Schendel & Hofer, 1979). In its most extreme form, a strategic choice perspective suggests that organizations change their strategies immediately to reflect changing conditions in their environments (Chaffee, 1985). An organization's managers are viewed as assessing external and internal conditions and adjusting the strategy of the organization to maintain "satisfactory alignments of environmental opportunities and risks, on the one hand, and organizational capabilities and resources, on the other" (Miles, 1982: 14). Thus, management of strategy is seen as the means through which organizations deal with changes in their external environments.

Other strategy theorists have characterized strategy as relatively inertial and have argued that organizations are constrained in their ability to adapt. According to this perspective, organizations have a general tendency to preserve strategy rather than radically change it (Quinn, 1980). Miller and Friesen (1984) discussed strategic momentum, a tendency toward persistence that makes organizations slow in adapting to environmental changes. As Starbuck noted: "When an organization adopts one class of strategies, it automatically makes the adoption of other strategies difficult or impossible" (1965: 470). For example, Porter (1980) identified mobility barriers in industries that act as deterrents to the unencumbered movement of firms from one strategic position to another. Researchers have also noted that strategy influences the structure of organizations (Chandler, 1962; Rumelt, 1974), which in turn may limit the range of future strategies considered and implemented (Fredrickson & Iaquinto, 1989). Investment in personnel, capital, and other resources required to pursue a particular strategy can be significant, in turn limiting an organization's ability to change strategy easily (Freeman & Boeker, 1984). Furthermore, over time a given strategy attracts and fosters a set of managerial values and philosophies that are wedded to the strategy (Guth & Taguri, 1965), limiting the range of future strategic choices that are considered.

To the extent that organizational strategy can be characterized as inertial, the strategy that an organization first adopts will circumscribe later strategic change. If past organizational strategies have bearing on the present, the logical place to begin an investigation of the determinants of strategic change is the earliest phase of an organization's existence, its founding (Romanelli & Tushman, 1986). Kimberly noted the importance of the founding of organizations, observing that "just as for a child, the conditions under which an organization is born and the course of its development in infancy have important consequences for its later life" (1979: 438).

Directing attention to an organization's founding also highlights the importance of history in determining future actions (Hannan & Freeman, 1977). Several organizational researchers have noted the importance of history. Lawrence (1984) and Zald (1987) argued that an organization's history

is crucial to its future development and that organizations can only be understood in light of their early phases and subsequent evolution. Selznick (1957) described how early political and social processes largely determine organizational strategy and patterns of subsequent activities. Stinchcombe (1965) noted that events surrounding the creation of a new organization have a long-lasting effect on its future development. Given these potentially powerful historical effects, an important predictor of an organization's current strategy may be its strategy at founding.

The apparent contrast between a strategic choice perspective and an inertial perspective suggested an examination of the conditions under which strategic change can and does occur. This study examined the extent to which organizational strategies exhibit patterns of stability or change by examining the evolution of strategy among firms in the semiconductor industry between the time of their founding and the time of the study. By examining organizational foundings and the histories of organizations from founding on, I attempted to identify the specific conditions that influence changes in strategy.

Strategic Types

Recent work in strategy has often examined the construct of business-level strategy—how firms compete in a business or industry—through strategic typologies (Porter, 1980). Such typologies are especially useful for parsimoniously conveying fundamental differences in the strategic approaches taken by organizations (Hambrick, 1980). Ansoff and Stewart (1967) first introduced a strategic typology specifically created for technology-based industries, and Maidique and Patch (1982) extended it. Extensive pretesting of strategic typologies in the semiconductor industry, including Porter's (1980), Miles and Snow's (1978), and Maidique and Patch's typologies, indicated that the last had the greatest content validity.¹ Maidique and Patch defined four broad strategies commonly found in high-technology industries in terms that are relevant to a technology-intensive environment. Although each of the strategic types they defined was distinct, Maidique and Patch noted that firms could compete using more than one strategy simultaneously. The four strategies are as follows:

(1) The first-mover, or first-to-market, strategy attempts to introduce a product to the market before the competition does so. It provides the advantages of a temporary monopoly in exploiting a new technology during the period preceding the adoption of the new technology by competitors.

(2) The low-cost producer, or cost-minimization, strategy achieves a relative cost advantage over competitors through economies of scale in manufacturing and distribution, through process and product-design modifications to reduce costs, and through overhead minimization and operating-cost control.

¹ See the Methods section for a more detailed discussion of content validity and reliability.

(3) The second-mover, or fast-follower, strategy involves quick imitation of innovations pioneered by a competitor. The emphasis is generally on attracting customers away from the technical innovator. Second-movers attempt to learn from the innovator's mistakes in order to develop an improved, more reliable product that may include features customers desire, and avoid products that have proved to be market failures.

(4) The niche strategy focuses on serving small pockets of customers with special applications of a basic technology.

This study examined the initial strategies that semiconductor manufacturers adopted when they were founded and the conditions under which those initial strategies changed. Before discussing specific variables and their hypothesized effects on the stability of strategy from founding, a point should be clarified. I expected adaptation and change in organizational strategy to be temporal. Younger organizations are more likely to have retained their initial strategies and thus to exhibit less change in strategy than older organizations, which will have had more time to deviate from their initial strategies. The hypothesized effects of age are discussed explicitly below and accounted for in the analysis of the data. The hypotheses assume organizations of the same age.

Development of Hypotheses

Stinchcombe (1965) noted that pressures for the permanence of organizational characteristics are the result of two separate sets of influences: (1) conditions at the time of an organization's founding, which he called "imprinting forces," that strongly define initial characteristics and create internal consensus around the initial form of the organization and (2) events subsequent to founding—"traditionalizing forces"—that tend to preserve previously adopted organizational characteristics. This study examined these two sets of influences for their effects on the permanence of organizational strategies adopted at founding.

Conditions at Founding

The circumstances of an organization's founding play an important role in imprinting the initial form of the organization and limiting later organizational change (Kimberly, 1975; Stinchcombe, 1965). Previous research (Boeker, 1988) has examined the role a firm's environment and founding entrepreneur play in shaping its initial strategy. Organizations set on a course at founding from which change may be costly or difficult, suggesting that early patterns of organizing may limit the range of future strategic actions that firms are likely to consider.

The extent to which consensus develops around a strategy at founding may make the strategy less open to subsequent questioning or redirection by organizational participants. The literature on strategic change suggests several factors that can influence the imprinting of an organization's strategy: the extent to which the initial strategy is dominant, the distribution of influence in the organization, and the ownership of the organization.

Dominant initial strategy. When an organization adopts a particular strategy, a great number of interests simultaneously become vested in that way of doing things, and the organization's strategy can take on the character of an independent, autonomous goal (Selznick, 1957). This is especially true when an organization adopts a single or dominant strategy, which may restrict the range of future strategies that the organization might consider. By focusing on a single strategic approach when it is founded, an organization limits the range of issues it must be concerned with. Porter, describing his three generic strategies of cost leadership, differentiation, and focus, noted that implementing each strategy requires different resources and skills: each strategy "implies different organizational arrangements, control procedures, and incentive systems" (1980: 40).

Maidique and Patch (1982) described each of their four strategic types as requiring different functional competencies in a technology as well as different types of resource commitments. For example, firms pursuing a first-mover strategy require a high level of competence in the basic technology, whereas low-cost producers place much more emphasis on cost-efficient production and require a much lower level of resource commitment to the basic technology (Maidique & Patch, 1982: 279).

Because the adoption of a particular strategy requires specific skills as well as investment in facilities and personnel that may only be marginally useful if a firm adopts a different strategy, firms adopting a single or dominant strategy may be less likely to change their strategy than firms pursuing several strategies simultaneously. For example, a firm pursuing only a first-mover strategy when it begins will likely have developed a strong consensus regarding the appropriateness of this strategy, will have acquired equipment, facilities, and resources uniquely suited for the pursuit of a first-mover strategy, and will have little knowledge about the competencies and skills required to pursue other strategies. Such a firm may be less likely to deviate from this strategic approach than one that attempted to pursue several strategies simultaneously when it began and already possesses competencies in several areas.

Theoretical literature from a wide variety of perspectives supports the notion that adoption of a dominant initial strategy will lead to little subsequent change in that strategy. The literature on individual-level commitment demonstrates that strong early commitment to a particular course of action makes subsequent change more difficult (Rusbult & Farrell, 1983; Salancik, 1977). As Staw (1981: 580–581) noted, there are general cultural norms supporting the notion that good leaders and managers are consistent and remain committed to decisions once they have made them. In addition, work on the escalation of commitment (Brockner & Rubin, 1985; Staw, 1976) has suggested that large initial investments of resources to a particular course of action may lower the likelihood of change in that course of action. Organization-level research on inertia and institutionalization has contended that organizational characteristics and processes that are strongly established when a firm begins become institutionalized over time (Hannan & Freeman,

1984; Meyer & Scott, 1983). Finally, from an economics perspective, Arrow (1974) and Nelson and Winter (1982) discussed how early patterns of activity become routinized as repertoires in which there is only limited change.

Hypothesis 1: Organizations that adopt a dominant strategy at founding will exhibit less subsequent change in that strategy than firms not adopting a dominant strategy.

Distribution of influence. The distribution of power and influence in an organization at founding can act as a source of potential support for its initial strategy. Miles and Snow (1978) found that chief executives' perceptions of the top three functions vital to their organizations' competitive success were different depending on the strategy pursued by the organizations. Hambrick (1981), using the Miles and Snow typology, found support for an association between the strategy an organization pursued and the influence of functions within the organization. Hitt, Ireland, and Palia (1982) provided similar evidence in support of a bivariate relationship between organizational strategy and the importance of specific functional groups. Finally, Snow and Hrebiniak (1980), also using the Miles and Snow typology, measured the construct of distinctive competence in terms of organizational strengths in particular areas, such as marketing or manufacturing. They empirically demonstrated that, to be successful, an organization's strategy must be supported by the appropriate distinctive competencies. For example, an efficiency-oriented strategy—in Miles and Snow's terminology, a defender strategy—required a functional orientation aligned with efficient exploitation of an established set of products and markets. Under such a strategy, the functions of manufacturing and production became critical contingencies and acquired great power. Over time, an organization's strategy can become further reinforced and institutionalized through the influence of powerful functional groups that are themselves supported by that strategy (Pfeffer, 1981).

In firms founded with a dominant strategy, the distribution of influence in favor of functions that support the dominant strategy can help maintain that strategy over time. To the extent that an organization pursues a dominant strategy and the distribution of functional influence in the organization is aligned with that strategy, the initial strategy will exhibit less subsequent change than will occur when those conditions do not exist. Thus, an interaction can be posited between the extent to which a firm pursues a dominant strategy and the internal distribution of functional influence: compared to other organizations, those in which the initial distribution of functional influence supports a dominant initial strategy should exhibit less change in strategy since founding.

Braun and MacDonald (1981) noted that, within the semiconductor industry, most firms include three major types of line functions: research and development, manufacturing and production, and marketing and sales. Maidique and Patch (1982) described the competencies that each of the four strategies requires in terms of several of these functions.

First-movers are expected to place high emphasis on research and development. Organizations that rely heavily on innovativeness and being first

to the market with a new product should exhibit a high level of functional expertise in research and development. Consequently, a dominant first-mover strategy will more likely be perpetuated in organizations with a strong research and development function at founding, which will provide a basis of continuing support for that strategy.

Hypothesis 2a: Firms in which a first-mover strategy is dominant and in which the research and development function has relatively high influence will exhibit less change in the first-mover strategy from founding than firms in which those conditions are lacking.

Low-cost producers are likely to emphasize manufacturing and production activities. Organizations that rely heavily on efficiency and low-cost production are expected to have a high level of functional expertise in manufacturing and production. In turn, a dominant low-cost strategy is likely to gain support and be perpetuated in organizations that begin with a strong production or manufacturing function.

Hypothesis 2b: Firms in which a low-cost strategy is dominant and in which the manufacturing and production function has relatively high influence will exhibit less change in the low-cost strategy from founding than firms in which those conditions are lacking.

Managers of firms pursuing a second-mover strategy attempt to create imitations (often improved imitations) of products that other organizations have introduced. Successful second-movers serve unmet customer needs by creating slightly modified imitations of existing products. Second-movers will emphasize the functions of marketing and sales, and a second-mover strategy is likely to have more support in organizations where the marketing and sales functions are relatively strong.

Hypothesis 2c: Firms in which a second-mover strategy is dominant and in which the marketing and sales function has relatively high influence will exhibit less change in the second-mover strategy from founding than firms in which those conditions are lacking.

The niche strategy also attempts to satisfy specific customer needs that are not served by existing organizations. When pursuing a niche strategy, a firm actually focuses on a small subset of a market; this strategy is similar to Porter's (1980) focus strategy. Customer and market knowledge is especially important, and the dominant competencies required are in marketing, sales, and customer service. Organizations with functional strengths in the areas of marketing and sales are more likely to maintain a niche strategy.

Hypothesis 2d: Firms in which a niche strategy is dominant and in which the marketing and sales function has relatively high influence will exhibit less change in the niche strategy from founding than firms in which those conditions are lacking.

Management ownership at founding. Useem (1984) noted that if an

organization's managers control ownership at founding, the extent of subsequent deviation from an initial strategy may be less than if owners are not managers. Owner-managers are likely to play a highly active role in the activities of a company and be very involved in the formulation of its founding strategy. This personal involvement may make them unwilling to attempt significant changes in the original strategy. Salancik (1977) noted that individuals tend to behave in ways that are consistent with implications of their past behavior and that one of the effects of commitment is to make an earlier-adopted action open to little change. Thus, owner-managers who helped formulate an initial strategy may be less likely to change it than managers who are not owners. Conversely, owners who are not managers may have little personal interest in maintaining an initial strategy that they were not involved in formulating.

Economists interested in principal-agent relationships have also investigated differences between the expected behaviors of managers who are owners and managers who are not owners. Agency theory defines the relationship between owners and managers as a contract between agents and principals in which the incentive structures that are explicitly or implicitly incorporated in the contract condition the agents' behavior. Theories of agency cost further predict that individuals will make operational decisions that maximize their own personal utility (Fama & Jensen, 1983). As Jensen and Meckling pointed out, the benefits derived by an owner-manager may involve "non-pecuniary aspects of entrepreneurial activities" (1976: 312), such as the ability to initiate, build, and maintain an organization with a strategy that the owner-managers themselves have conceived and defined. Thus, founding owners who are also managers may show less willingness to deviate from an organization's initial strategy than owners who are not managers.

Hypothesis 3: Organizations in which managers have a high proportion of firm ownership at founding will exhibit less change in strategy than organizations with less management ownership.

Conditions Subsequent to Founding

To this point, the extent to which initial strategy may resist subsequent change has been related to founding conditions. A more complete understanding of the process by which firms either retain or change their strategies can be gained by considering events subsequent to founding that may also influence the extent of organizational change. Stinchcombe (1965) described such events as "traditionalizing forces." Three factors that may influence the extent to which a firm deviates from an earlier adopted strategy are its performance, its age, and the length of its founding entrepreneur's tenure after founding.

Organizational performance. "If it isn't broke, don't fix it" is a common adage that seems to apply to the manner in which many organizations are managed. As Oster noted: "As long as profit performance is satisfactory,

firms will continue to allocate internal resources using whatever rules of thumb they've used in the past" (1982: 377). Mintzberg (1983) noted that high-performing organizations are seldom faced with stakeholders who advocate fundamental changes in basic operating procedures. Of course, if an organization fails to achieve a sustainable level of performance, it may be forced into a fundamental reordering of activities (Tushman & Romanelli, 1985). For example, Chandler (1962) described the manner in which strategic changes emerged in Standard Oil of New Jersey, E. I. duPont de Nemours and Company, and the General Motors Company as a response to poor performance.

Firms will retain their founding strategies to a greater extent when their performance since founding has been satisfactory, leading to few internal and external pressures for change. During performance declines, organizational members may be more willing than they were previously to initiate and undertake change in the existing strategic direction of their firms.

Hypothesis 4: Organizations with poor performance since founding will exhibit greater change in strategy than organizations with high performance since founding.

Environmental variation and organizational age. Since all the firms in this study operated in the same industry and thus were under similar influences, it was difficult to make specific a priori predictions concerning which environmental changes would lead to changes in strategy for specific firms. If environmental variation takes place at the industry level and a group of firms are operating within the same industry, the total amount of environmental change any organization will have experienced since it was founded should be associated with the type and number of distinct environmental periods the organization has passed through. Carroll suggested that changes in organizational characteristics are to a large extent a result of an organization's having encountered a succession of environmental changes, stating: "Organizational age will coincide roughly with the amount of environmental change experienced by an organization" (1983: 313). Thus, aging may be a surrogate measure of an organization's exposure to environmental change.

To the extent that environmental changes are temporal, the age of a firm offers some indication of the amount of environmental variation it may have experienced. Older organizations will have had more time and thus will have faced more pressure to deviate from a strategy adopted early.

Hypothesis 5: Younger organizations will exhibit less change in strategy since founding than older organizations.

Entrepreneur's tenure. Research on executive tenure (Goodstein & Boeker, 1988; Helmich & Brown, 1972) has demonstrated that the occurrence of executive succession leads to organizational changes. Grinyer and Spender (1979) found that organizations initiated basic changes in strategy or structure only after the replacement of senior managers or the departure of their founding entrepreneur. Sarason (1972) argued that entrepreneurs who stay with a firm after founding for a lengthy period are able to institu-

tionalize initial strategic and structural decisions. After examining newspaper organizations, Carroll (1984) empirically demonstrated that the departure of a founding entrepreneur increased the probability of firm failure. The length of time that the founder remains with a firm can influence the extent to which an initial strategic direction becomes a well-defined and accepted manner of operating that may resist future change.

Hypothesis 6: Organizations in which the founding entrepreneur has a long tenure after founding will exhibit less change in strategy since founding than organizations whose founding entrepreneur has a short tenure.

Figure 1 depicts a model of the effects on the extent of change from an organization's initial strategy to its current strategy of the three conditions at founding and three events subsequent to founding studied here.

METHODS

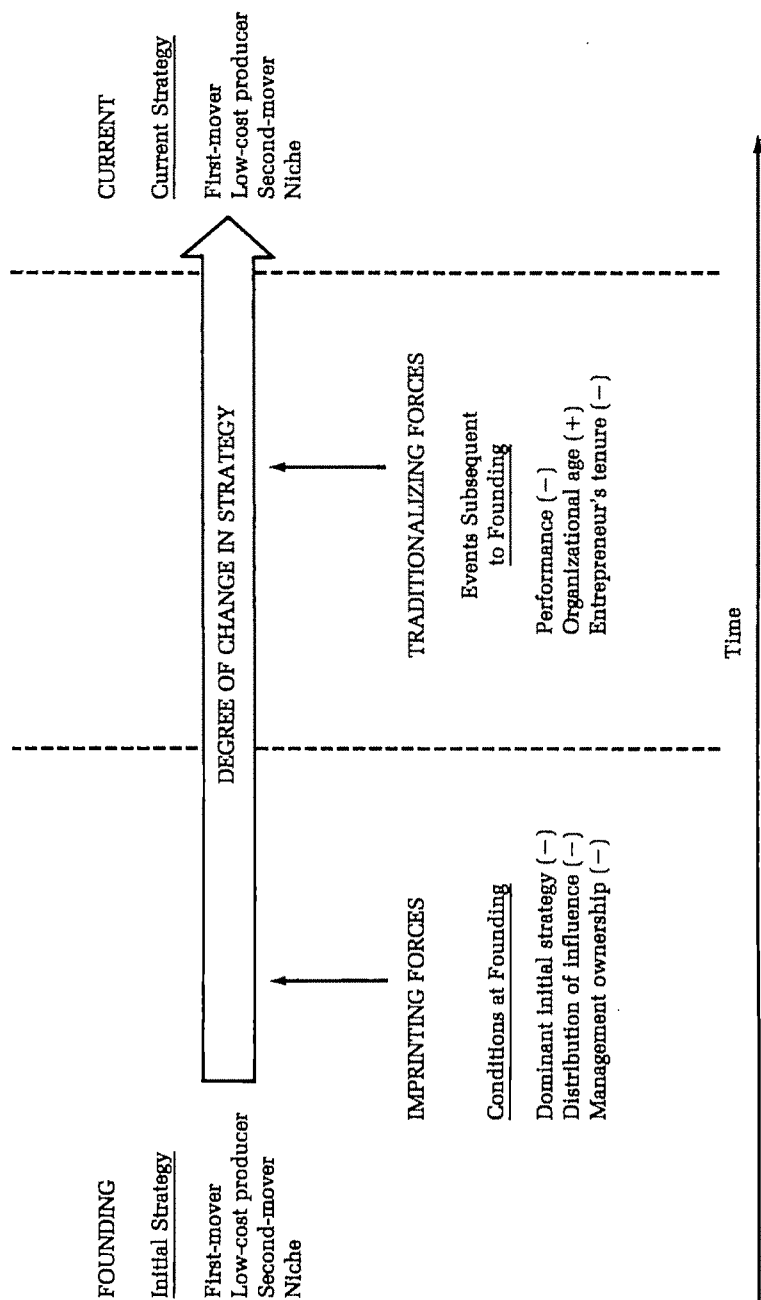
The model was tested on 51 semiconductor producers operating in 1984 in the Santa Clara–San Jose area of California known as Silicon Valley. All the organizations were basically single-business firms that were almost exclusively involved in the semiconductor industry. We initially solicited the participation of 56 semiconductor firms, which constituted the entire population of such businesses that could be identified in the target area.² However, 5 firms refused to participate. Chi-square tests comparing the small number of firms that did not participate with the participating firms indicated that the nonparticipants did not differ significantly from the group studied in terms of performance, size, age, or ownership.

One limitation of the data is that all the firms examined were survivors. As Freeman (1986) noted, studying only surviving firms can create biases if survivors vary from nonsurvivors on critical dimensions being studied. Unfortunately, as a practical matter, it is nearly impossible to obtain accurate historical measures of business strategy for semiconductor firms that have failed, particularly those that failed some time ago. A study by Dataquest (1984) of all Silicon Valley semiconductor organizations started since 1977 showed that none had failed yet. Although a low failure rate certainly does not obviate the problems of survivor bias, it does limit the effect it might have on the results obtained, particularly since performance was not a dependent variable in the present study.

Data were collected from three sources: (1) personal interviews with top managers of the organizations, typically including the president or chief executive officer; (2) information collected by and made available through three of the four largest market research firms serving the semiconductor industry; and (3) information from articles in the electronics and business press.

² Jerry Goodstein conducted interviews at one-half of the semiconductor organizations in the study.

FIGURE 1
A Model of the Relationship Between Founding and Current Organizational Strategies^a



^a Plus and minus signs following variables indicate the hypothesized direction of the relationship between that variable and the degree of change.

Measures

The most important criterion for choosing a typology to measure or evaluate business-level strategy is content validity—in this case, how adequately does a typology describe differences in the ways that firms compete in the semiconductor industry? I completed extensive pretests of the content validity of the Maidique and Patch (1982) typology and other strategic typologies one year before the actual study. The chief executives of five semiconductor firms were asked to judge the extent to which three business strategy typologies accurately represented the manner in which firms competed in their industry. The typologies were from Miles and Snow (1978), Porter (1980), and Maidique and Patch (1982). Each chief executive received a list of potential strategies from each typology and a short description of each specific strategic type. For Miles and Snow's typology, the strategies were prospector, defender, analyzer, and reactor; for Porter, they were cost leadership, differentiation, and focus; and for Maidique and Patch, they were first-mover, second-mover, low-cost producer, and niche. There was unanimous agreement among the five chief executives that the Maidique and Patch typology best described how firms in the semiconductor industry compete.³

In order to increase the external validity of the strategy measure, responses from individuals outside each firm were used to evaluate its current strategy, and responses from individuals within each firm were used to evaluate its initial strategy.

Current strategy. Following Snow and Hambrick's (1980) and Harrigan's (1983) suggestions that outside appraisers should validate measures of organizational strategy, I asked independent judges from three of the four largest market research firms that monitor the semiconductor industry to evaluate the current strategies of the 51 firms studied. The current strategy of each firm was measured proportionally on a 100-point scale, which appears in the Appendix. Each judge, one from each of the three market research firms, allocated points representing the extent to which an organization could be characterized as pursuing one of the four Maidique and Patch strategies. For example, if a firm currently pursued only a first-mover strategy, it received a 100 points for first-mover strategy and no points for the other three strategies. A firm that was evenly split between pursuing a first-mover and a second-mover strategy received 50 points for each strategy. The firms studied had values of zero in one of the four strategy types in approximately 90 percent of the cases and values of zero in two or more of the four strategy types in over 70 percent of the cases.

The three judges were sufficiently familiar with the semiconductor or-

³ Using a strategic typology that is more applicable to technologically intensive industries has both advantages and disadvantages. Avoiding more abstract strategy categories may enhance the quality and accuracy of the responses. However, the Maidique and Patch typology may not be as generalizable as other typologies.

ganizations studied that at least two measures of strategy could be obtained for each firm. I constructed the measurement of current strategy by averaging the scores of all the judges for each firm. Thus, each organization's current strategy score represents the outside judges' average appraisal of the extent to which the firm pursued each of the four strategies.

Since the responses were from three individuals associated with three different outside organizations, informant bias was limited. Because this study attempted to evaluate firms pursuing different strategies by using assessments from several independent sources, the consistency of the responses of different judges (interrater reliability) presented an important issue in terms of both construct validity and the validity of the measurement approach that was taken. Pearson correlation coefficients for interrater reliability were all greater than .80; those coefficients indicate a high degree of agreement among the judges on the strategic approaches of the 51 organizations and lend further support to the validity of the Maidique and Patch typology.

Initial strategy. To measure the initial strategy of the semiconductor firms, we asked the founding entrepreneurs or members of founding teams what they recalled their initial strategy to be. In approximately 75 percent of the firms, we were able to interview either the entrepreneur or a member of the founding team. In all other cases, we interviewed either the current president or a top executive of the firm who knew about the founding. Obviously, recall data have inherent limitations, among the most significant being hindsight bias (Fischhoff, 1975). To increase the salience of founding in the informants' memories, we first asked other questions regarding more objective events occurring at that time, such as which products the company first produced and shipped. Questions about the organization's strategy at founding followed. All respondents were asked to judge their firms' initial strategies on the same 100-point scale that was used to measure current strategy. One firm was dropped from this portion of the analysis because the executive interviewed was unable to evaluate the firm's initial strategy reliably.

A second approach for assessing initial strategy involved the collection and examination of articles and press accounts written about each organization at the time of its founding. As Harrigan (1983) noted, comparisons of how various firms within a given industry compete can often be made by investigating media and trade journal coverage of the industry. I examined articles from the business and electronics press for statements regarding what products would be produced and what competitive approach would be used—for example, competition on cost, innovation, or custom applications. Statements about the competitive approach of individual semiconductor firms at the time of their founding were quite common; most semiconductor firms seem eager to generate publicity and increase their legitimacy at founding by making frequent public statements about their competitive approach—several had even hired public relations firms.

The recall perceptions of initial strategy were compared to press statements made at the times of founding. These comparisons showed a high degree of consistency, suggesting that hindsight bias was low.

As a final means of validating the initial strategy measure, the market research executives who judged each firm's current strategy were asked to judge the initial strategies of firms they were familiar with. At least one market researcher rated 48 of the 51 firms, or 94 percent, on initial strategy; 82 percent of the firms received ratings from two individuals; and 61 percent received ratings from all three external judges. I averaged responses from all judges for each of the firms and compared them to the average rating of initial strategy given by the founding managers. Pearson product-moment correlations indicated fairly high correlations between the two ratings (.82 for first-mover, .57 for second-mover, .74 for low-cost producer, and .68 for niche), providing further evidence of the validity of the initial strategy measure. However, since the rating of initial strategy was done after each judge had rated the firm's current strategy, the possibility of priming, or response-response bias, exists, so this validity check needs to be interpreted with caution.

Dominant initial strategy. A firm was evaluated as having a dominant strategy if its rating for initial strategy was at least 50 points out of 100 points in any one of the four strategy categories. On this basis, I categorized 38 firms in the study as having a dominant strategy. Firms with a dominant strategy received 1 in that strategy type and 0 in the three other categories. Firms without a dominant strategy received a 0 in all four categories.

An implication of the dominant strategy hypothesis is that firms that attempt several strategies are likely to show a greater range of variation in the types of skills and resources used than those attempting a single strategy. The amount of variation in the functional backgrounds of the members of a founding group offers some indication of the breadth of skills available to a firm. To examine variation among firms in the functional dispersion of founding members, I compared the functional dispersion of the founding groups of firms with a dominant strategy to that of those without dominant strategies. Founding group members were grouped by functional responsibility into six major categories: research and development, manufacturing and production, marketing and sales, finance, general management, and others. Because functional backgrounds are categorical, I used the Gibbs-Martin index (Blau & Schwartz, 1984) to assess the functional dispersion of founding groups.

The Gibbs-Martin index of heterogeneity is defined as $1 - \sum p_i^2$, where p is the proportion of the total group that each category represents. I computed Gibbs-Martin indexes for the functional dispersion of each organization's founding group, and performed chi-square tests to determine if there were differences in the amount of functional dispersion between firms with dominant strategies and those without dominant strategies. The results of the chi-square tests demonstrated significant differences between firms with a dominant strategy (Gibbs-Martin index = .66) and those without a domi-

nant strategy (Gibbs-Martin index = .82). This computation provides additional evidence that the functional expertise of the founding groups of organizations without a dominant initial strategy varies more than the expertise of the founders of organizations that have a dominant initial strategy.

Distribution of functional influence. Measurement of the influence of specific functions requires some knowledge of the relative level of resources devoted to various functional areas (Mintzberg, 1983). One construct for determining resource allocation is the level of staffing in various functions relative to staffing in other organizations in the same industry (Pfeffer, 1981). The functional areas that are regarded as most important within an organization are likely to receive a disproportionate share of employees.

As in many other industries, the founding of a semiconductor firm is typically the work of a single individual who then assembles a founding group that forms the core of the organization's initial top management. The composition of the founding group offers an indication of the earliest functional orientation of the firm. Organizations that place great emphasis on a given function are likely to begin with a founding group containing a disproportionate share of people with that particular type of functional experience. Differences among semiconductor organizations in the functional composition of their founding groups provide a measure of differences in each firm's initial functional emphasis and orientation. For example, a firm in which research and development is emphasized may initially have a higher proportion of founding group members involved in research and development activities than other semiconductor firms.

The distribution of functional influence at founding was measured as the proportion of founding group members, excluding the initial entrepreneur, who were engaged in the areas of (1) research, design, and development; (2) production and manufacturing; and (3) marketing, sales, and customer service. Information on the functional backgrounds of members of the founding group of each firm studied was available from two of the semiconductor market research firms.

Performance. Since many of the firms studied were privately held, financial performance data, such as information on profitability, are often not available. However, because many semiconductor manufacturers are willing to operate at a low level of profitability while building market share, sales are often a better indicator of performance than profits (Dataquest, 1984).

Performance for each year an organization had operated was measured by comparing the rate of change in sales from year to year to average changes in sales levels for the entire group for that year. For each year of operation, I categorized firms as poor performers if their rate of increase in sales was more than one standard deviation below that of the average rate of sales increase for the group as a whole in that year. The number of years of poor performance was then summed over the number of years the organization had been operating and the sum divided by the number of years of operation. The resulting measure is the number of years in which a firm has experienced poor performance divided by the age of the firm. To eliminate ambi-

guity, performance is reversed-coded in the reported results so that higher performance scores represent better performance. Two of the firms studied did not provide sales data and were eliminated from this portion of the analysis.

Other variables. *Organizational age* was measured as the number of years since a firm was incorporated. *Entrepreneur's tenure* was the number of years the founding entrepreneur had remained with a firm after its founding, divided by the age of the firm. *Management ownership* was the proportion of firm ownership that members of the founding group initially controlled. Ownership data were unavailable from two firms.

Analyses

The effects of conditions at and after founding on the persistence of initial strategies (Figure 1) were tested by examining the effect of each set of variables on the degree of change in strategy from founding. As an operational measure of the extent to which a strategy had changed from founding, I used a difference score, the absolute value of the difference between each firm's measure of initial strategy and current strategy for each of the four strategic types. For example, if a given organization's measure for first-mover strategy at founding was 70 points and its measure for current first-mover strategy was 50 points, its difference score for first-mover strategy—representing the amount of change in that strategy—would be 20.

The advantages of difference, or gain, scores, particularly when evaluating panel data, are well documented (Huck & McLean, 1975).⁴ A potential limitation to this measure of strategy is the use of a fixed (100-point) scale to measure initial and current strategy. A fixed scale results in an ipsative measure, since the scale has fewer degrees of freedom than variables. In this study, for example, if an organization's scores for first-mover, second-mover, and low-cost strategies are known, the niche strategy score can be determined since all four scores total 100 points. However, as Block (1957) and Hicks (1970) pointed out, ipsative scales can be used to make intraindividual or intrafirm comparisons, such as the present comparisons of the strategy pursued by a single organization at two points in time.

Since each firm studied received measures for both initial and current strategy across the four strategic types, I estimated four separate difference scores, one each for the first-mover, low-cost producer, second-mover, and niche strategies, for each firm. Difference scores for each of the four strategic types were regressed against the variables predicted in Hypotheses 1 through 6 to influence the extent of change in strategy from founding. The functional form of the model used to estimate the difference score is as follows:

$$|\text{difference between initial and current strategy}| = f(\text{dominant initial strategy, functional influence, dominant strategy} \times \text{func-})$$

⁴ One potential problem with difference scores is the normality of distribution of the scores. Kolomogorov-Smirnov D-statistics indicated that assumptions of normality were not violated.

tional influence, management ownership, organizational performance, organizational age, and entrepreneur's tenure).

RESULTS

Table 1 indicates group means and standard deviations and the correlations among the variables. With age not controlled, correlations between initial and current strategies indicate that the two strategy measures are fairly closely related, although they represent assessments of strategy at different points in time and from different sources.

Table 2 represents results of the tests of Hypotheses 1–6. Hypothesis 1 predicted that firms that adopt a dominant strategy at founding will maintain this initial strategy over time. The coefficients for the effect of dominant initial strategy on strategic change were significant in three of the four equations. Compared to organizations with no dominant founding strategy, organizations with a dominant low-cost, second-mover, or niche strategy at founding exhibited less change in each of these three strategies since founding, indicating general support for Hypothesis 1.

Tests of Hypothesis 2 demonstrate that the interaction of functional influence at founding with the dominance of an initial strategy is a significant predictor of strategic change in two of the four equations. Findings supported both Hypothesis 2a, concerning the effects of research and development influence on the maintenance of a first-mover strategy, and Hypothesis 2b, on the effect of manufacturing and production influence on the maintenance of a low-cost strategy, indicating that firms with both a dominant initial strategy and patterns of subunit influence that are aligned with that strategy show less change in strategic approach than firms lacking that configuration. Conversely, Hypothesis 2c, which concerned the effect of marketing and sales influence on the maintenance of a second-mover strategy, and Hypothesis 2d, on the effect of marketing and sales influence on the maintenance of a niche strategy, received no support. Main effects for the distribution of functional influence alone, although not hypothesized, were also tested in each of the four models and are shown in Table 2. Results for the main effect of functional influence indicate that functional influence at founding was unrelated to the degree of change in organizational strategy.

Tests of the effect of ownership on the difference between current and founding strategy (Hypothesis 3) demonstrate significant effects in two of the four equations. In the case of both the first-mover and niche strategies, a high level of ownership by founding managers was associated with low change in initial strategy, supporting the hypothesis. The ownership of an organization did not significantly influence the association between low-cost and second-mover initial and current strategies.

A limitation of the specification of ownership in this model is that only ownership at founding was used to predict the retention of founding strategy. Obviously, not only ownership at founding, but subsequent change in ownership, will influence the extent to which change in organizational strat-

TABLE 1
Correlations Between Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Difference scores																										
1. First-mover	16.23	4.34																								
2. Low-cost producer	14.46	3.24	.37																							
3. Second-mover	21.42	5.67	.10	.13																						
4. Niche	13.61	3.42	.31	.18	.19																					
Initial strategy																										
5. First-mover	22.38	13.58	-.26	-.11	.14	.03																				
6. Low-cost producer	23.80	12.53	.18	-.43	.09	-.10	-.18																			
7. Second-mover	21.48	10.18	.06	.09	-.38	.07	-.09	-.15																		
8. Niche	32.34	15.82	-.09	.05	-.03	-.40	.08	-.12	.07																	
Current strategy																										
9. First-mover	21.61	11.28	-.18	.12	.10	-.04	.47	.11	-.19	-.17																
10. Low-cost producer	29.84	17.37	.11	-.21	.06	-.02	.14	.54	.12	-.06	-.11															
11. Second-mover	17.37	12.51	.05	.00	-.31	.03	-.08	.13	.44	-.10	-.08	-.04														
12. Niche	31.19	16.16	-.06	.01	.11	-.18	-.03	-.07	.05	.51	.03	-.12	-.01													
Dominant initial strategy																										
13. First-mover	0.20	0.27	-.21	-.15	.16	.03	.56	-.14	-.06	.03	.38	-.11	-.05	-.11												
14. Low-cost producer	0.19	0.25	.19	-.47	.07	-.12	.15	.49	.12	-.09	.13	.42	-.07	-.02	-.31											
15. Second-mover	0.17	0.23	.09	.07	-.39	.10	-.12	.16	.43	.08	-.06	-.07	.36	-.05	-.27	-.18										
16. Niche	0.19	0.25	-.14	.07	-.04	-.43	.05	-.15	.05	.48	.00	-.02	.02	.40	-.20	-.19	-.13									
Distribution of influence																										
17. R&D	0.31	0.08	-.28	-.05	.09	.13	.31	-.10	-.09	.06	.24	-.17	-.05	.08	.33	-.10	-.06	.04								
18. Manufacturing production	0.23	0.06	-.16	-.36	.01	.07	-.14	.29	-.12	-.11	-.15	.31	.03	-.04	-.12	.27	-.07	-.10	-.18							
19. Marketing-sales	0.29	0.08	.10	.12	-.19	-.21	-.06	.03	.18	.22	-.03	-.09	.29	.25	-.09	-.04	.14	.17	-.16	-.21						
Other moderators																										
20. Organizational age	10.90	8.67	.31	.35	.40	.45	-.03	-.12	.08	.11	-.08	-.03	.11	.05	-.02	-.09	.06	.08	-.07	.08	.00					
21. Initial ownership	0.43	0.21	-.35	-.19	-.28	-.39	-.02	.12	.07	.05	.12	-.03	-.08	.01	.00	.10	.05	.03	.06	-.02	-.04	-.02				
22. Current ownership	0.26	0.11	-.21	-.15	-.21	-.23	.03	.05	-.03	.09	.09	-.01	-.04	.03	.03	.04	-.01	.06	.06	.00	-.03	-.17	.36			
23. Performance	0.17	0.15	-.12	-.41	-.39	-.16	.11	-.04	-.06	.08	.09	.01	-.10	.04	.09	-.01	-.03	.04	.02	-.05	.04	.14	-.07	-.16		
24. Entrepreneur's tenure	3.70	2.31	-.32	-.19	-.02	-.14	.17	.08	-.06	.02	.10	.04	-.07	-.03	.16	.07	-.06	.00	.09	-.01	.05	.25	.18	.24	.11	

^a N = 48; all correlations above r = .25 are significant at p < .05.

egy takes place. If owner-managers relinquish their ownership control soon after founding, an organization will be open to more influence from outside owners. Theoretically, two conditions would seem to be required for ownership to have an influence on the maintenance of a founding strategy: founding managers must both own a significant share of an organization at founding (Hypothesis 3) and subsequently retain ownership of the firm. Thus, the level of current ownership by founding group members is also important.

However, the bivariate correlations of current ownership with strategy difference scores (Table 1) showed no effect of current ownership. When the models in Table 2 were estimated a second time to include both the main effects of initial and current ownership and the interaction of founding and current ownership, there were no significant effects for any of the ownership variables. Both the number of firms studied and the limited collinearity among the three ownership variables (initial ownership, current ownership, and the interaction of initial and current ownership) may account for the lack of significant effects. Other models using various combinations of the ownership variables, singly as well as in pairs, also proved inconclusive. Thus, for this study, only initial ownership appears to be a significant antecedent of subsequent strategic change.

Firm performance is significant in two of the four equations, providing moderate support for the prediction that poor firm performance results in greater pressure for deviation from a founding strategy (Hypothesis 4). Organizational age (Hypothesis 5) shows consistent and significant effects on the extent to which organizations change strategy from founding: in all four equations, older organizations demonstrate more change. Although the significant effects of neither performance nor age on strategic permanence are counterintuitive, they do highlight the importance of a temporal assessment of strategic change and the important role that poor performance plays in motivating strategic change.

Tests of the effect of a firm's founding entrepreneur's tenure on the relationship between founding and current strategy were significant only in the case of the first-mover strategy, providing minimal support for Hypothesis 6. Although entrepreneur's tenure is associated with strategic permanence for the first-mover strategy, any explanation of causal ordering must remain tentative. One explanation, supporting the introductory theoretical argument, is that if entrepreneurs leave soon after founding, those remaining find it easier to initiate changes in the founding strategy. An alternative view is that change in strategy occurs first, and the perhaps disenfranchised entrepreneur then either leaves or is forced out. Without specific event histories of the timing of entrepreneurs' departures and strategic changes, any causal argument must remain tentative.

Finally, although no specific effects were hypothesized, the empirical data were also examined for any evidence of a specific direction in strategic change. It may be easier for firms adopting a particular initial strategy to

TABLE 2
Results of Hierarchical Regression Analysis^a

Variables	Difference Scores ^b											
	First-Mover Strategy			Low-Cost Producer Strategy			Second-Mover Strategy			Niche Strategy		
	b	R ²	Δ R ²	b	R ²	Δ R ²	b	R ²	Δ R ²	b	R ²	Δ R ²
Constant	22.3			20.5			29.6			26.3		
Dominant initial strategy ^c	-.02 (.03)	.02	.02	-.10* (.05)	.07	.07	-.06* (.03)	.06	.06	-.09* (.04)	.07	.07
Distribution of influences ^d	-.05 (.07)	.03	.01	-.01 (.06)	.07	.00	-.07 (.09)	.07	.01	-.02 (.04)	.07	.00
Dominant strategy × distribution of influence ^e	-.21** (.07)	.12	.09	-.18* (.07)	.15	.08	-.06 (.08)	.08	.01	-.03 (.06)	.07	.00
Management ownership	-.602* (2.41)	.20	.08	-2.31 (2.03)	.18	.03	-1.20 (1.38)	.09	.01	-8.36** (2.78)	.16	.09
Performance	-.83 (.80)	.22	.02	-1.57* (.76)	.24	.06	-2.01* (.93)	.16	.07	-.67 (.46)	.19	.03
Organizational age	1.00** (.31)	.31	.09	1.15* (.55)	.30	.06	1.41* (.68)	.22	.06	1.48** (.49)	.28	.09
Entrepreneur's tenure	-.91* (.39)	.38	.07	-.41 (.38)	.32	.02	.03 (.04)	.22	.00	-.29 (.30)	.30	.02
F _{7,40} ^f	3.93**			3.42**			2.35*			3.21**		

^a Unstandardized regression coefficients are reported. Standard errors are in parentheses.

^b All R²s are adjusted.

^c For the first regression equation shown, the dominant initial strategy is the first-mover strategy; for the second, it is low-cost; for the third, second-mover; and for the fourth, niche.

^d For the four regression equations, the functional influences are, respectively, research and development, manufacturing, marketing, and marketing.

^e The first regression equation is for the interaction of first-mover strategy and R&D; the second is for low-cost strategy and manufacturing; the third, second-mover and marketing; and the fourth, niche and marketing.

^f Results are for the full equation.

* $p < .05$

** $p < .01$

move to other specific strategies if an initial strategy is abandoned. For example, unsuccessful first-movers may find it easier to attempt a second-mover strategy than a low-cost producer strategy, which might require completely different resources, facilities, and personnels. Examination of the data, however, showed no relationship between a firm's initial strategy and a specific decline or increase in any of the four strategies over time.

DISCUSSION

The major purpose of this study was to identify conditions under which strategic change occurs in organizations. Results indicate that both founding conditions and events subsequent to founding play important roles in either limiting or encouraging change in strategy. Conditions at founding, including the extent to which an initial strategy is dominant, the distribution of functional influence is aligned with the dominant strategy, and a firm is owned by its founding managers, help to imprint the initial strategy of a firm by building internal consensus around a given strategic approach. The adoption of a dominant strategy at founding limits the range of future strategic change that occurs, possibly as the result of a high level of commitment to and investment in facilities, personnel, and other resources uniquely suited to that strategy. The effects of the interaction of dominant strategy and functional influence demonstrate the manner in which the distribution of power and influence in an organization at founding can serve as an important source of continuing support for the organization's strategy. Organizations in which the distribution of functional influence is aligned with the chosen strategy at founding tended to retain their founding strategy over time. Finally, there was relatively less change in initial strategy when the founding owners of an organization were also members of the organization's management, possibly because such individuals were likely to be closely involved in the formulation and implementation of the organization's initial strategy and thus less willing to change it than managers who had not been founders would have been.

Conditions subsequent to founding, including an organization's performance, its age, and the length of the tenure of its founding entrepreneur, also influence the degree to which a founding strategy is perpetuated. Organizations with poor performance were more likely to change their initial strategy in the case of low-cost producer and second-mover strategies, providing some support for the hypothesis that it may be easier for managers to initiate changes in an existing strategy when performance is poor, since internal resistance to the change is likely to be weak. Given that past research has demonstrated that poor performance is significant in motivating strategic change (e.g., Chandler, 1962; Mintzberg, 1978), the present results actually appear to be rather limited. Organizational age is the only consistent antecedent of strategic change across all four strategies, supporting the intuitive notion that older organizations will have had a greater chance to deviate from their initial strategy. Finally, at least in the case of the first-mover strategy, entrepreneurs who remain with a company for a greater length of

time appear somewhat better able to personally institutionalize the organization's initial strategy, resulting in less subsequent change in strategy than occurs in firms whose founding entrepreneurs have a shorter tenure.

The founding of an organization provides an initial strategic direction, setting constraints on the manner in which the firm is operated and partially limiting subsequent change in strategy. The present research demonstrates empirical support for Stinchcombe's (1965) and Kimberly's (1975) earlier work examining the critical role of founding. We similarly discovered that founding decisions play an important role in imprinting organizational characteristics that are perpetuated over time. Strategy researchers must recognize the important role that these constraints place on strategic adaptation, given that organizations have at least some tendency toward inertia.

The findings of this study also have important implications for practicing managers. Managers of organizations must recognize that they operate within constraints, many of which come from the initial establishment of structures, routines, and repertoires that become institutionalized over time (Hambrick & Finkelstein, 1987; Hannan & Freeman, 1984; Nelson & Winter, 1982). Although history and past practice set important limitations, founding decisions do not entirely predetermine strategic direction. Change in strategy occurred most extensively when there had been relatively less opportunity for consensus to develop around a particular strategic approach. For example, greater change in strategy occurs when (1) firms lack a dominant initial strategy, (2) the influence of functions in an organization is not aligned with the initial strategy, (3) outside ownership interests predominate, and (4) the founding entrepreneur has remained in control for a greater portion of an organization's lifetime than is the case in other firms. It is important for managers to be aware of the implications of power and influence in affecting the rate and direction of strategic change. Much past work has characterized strategic change as a reaction to changing technological or environmental demands. One of the more interesting findings of this study is that the extent of strategic change also appears to be an important consequence of the interests of intraorganizational constituencies.

A potential limitation specific to this study concerns the use of the Maidique and Patch (1982) typology to differentiate and measure the strategies adopted by semiconductor firms. The main advantage of the typology is that it seems particularly relevant to describing differences in strategic approaches in technology-intensive industries. The concomitant disadvantage is that it may not be as generalizable as other typologies. The single-industry data also create inherent limitations in the generalizability of the findings. I chose to study only the semiconductor industry because it exhibited many characteristics that made it attractive for this study: its relatively recent history, its rapid rate of environmental change, and the important role played by individuals in establishing new organizations. Work in other industries on the development of organizations has also pointed to the importance of the founding period. Kimberly's works on rehabilitation organiza-

tions (1975) and the creation of a new medical school (1979) and Clark's (1972) work on the histories of several colleges demonstrate the important role played by founding in shaping the initial direction of organizations.

Future Research

As Fredrickson and Iaquinto (1989) noted, researchers have undertaken few longitudinal studies of strategy and have typically used qualitative methods for such work (Mintzberg, 1978; Mintzberg & Waters, 1982; Quinn, 1980). Although this study examined the evolution of strategy from founding as well as identifying several factors that may perpetuate given strategies, much more detailed longitudinal research is needed. For example, specific information on the timing of changes in environmental characteristics like uncertainty and munificence and concomitant changes in strategy would be useful. One limitation to this study is that it is difficult to make precise cause-and-effect arguments since organizational strategy was examined at only two points in time. Additionally, measures of functional influence other than staffing would offer more rigorous assessment of the role of power in influencing organizational change.

Past research on strategic change has invoked theoretical arguments that assume dynamic processes but has typically employed empirical models that assume static equilibrium. Knowledge about the specific timing of events predicted to encourage strategic change as well as the timing of strategic changes themselves would aid development of a more complete understanding of the underlying temporal process. Future research needs to develop more complete event histories of industries and organizations in order to test dynamic models of industry evolution and strategic change processes.

Two alternative perspectives, strategic choice and inertia, characterize much of the recent literature on strategic change. As Child and Kieser (1981) noted, the interesting question in that debate is not who is right but, rather, under what conditions is one view a better description of the observable reality than the other. In attempting to address that issue directly, this study demonstrated that both founding conditions and events subsequent to founding play important roles in limiting or encouraging strategic change. Further empirical work examining the process of strategic change within a historical framework offers a better understanding of strategic change and the circumstances under which either inertia or adaptation is likely.

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APPENDIX

The scale used to assess current strategy was the following: The following four descriptions of strategy are often used to characterize different ways in which firms compete in technology-intensive industries. To what degree do each of the following four descriptions fit your organization at the time it was founded? Show their relative importance by allocating shares of 100% of your effort.

- _____ A. Aim to get the product to the market before the competition. We are the first to introduce new products or major innovations.
- _____ B. Attempt to quickly create improved imitations of innovations that are pioneered by competitors.

- _____ C. Try to achieve a relative cost advantage over our competitors, thereby permitting us to offer our products at a lower price.
- _____ D. Rather than attempting to serve the entire market, focus on serving small
100% pockets of demand with special applications of the basic technology.

Warren Boeker earned his Ph.D. degree from the University of California, Berkeley; he is an assistant professor of management at the Graduate School of Business, Columbia University. His current research interests include strategic management, organization theory, entrepreneurship, and organizational ecology.

INERTIA AND CREEPING RATIONALITY IN STRATEGIC DECISION PROCESSES

JAMES W. FREDRICKSON
ANTHONY L. IAQUINTO
Columbia University

In two earlier studies, comprehensiveness, a characteristic of rational strategic decision-making processes, exhibited a positive relationship with organizational performance in a stable environment and a negative relationship with performance in an unstable environment. This research, a longitudinal extension of those studies, indicated that comprehensiveness exhibited considerable inertia, with only modest changes occurring since the original studies. Nevertheless, changes in organizational size and executive-team tenure, and the level of team continuity, were associated with changes in comprehensiveness; evolutionary increases in those variables were linked to a phenomenon we termed creeping rationality. In addition, the relationships that had been established between comprehensiveness and performance held for the years after the original studies. And exploratory analysis revealed significant across-industry differences in comprehensiveness.

Longitudinal research on strategic decision processes has typically been qualitative (e.g., Bourgeois & Eisenhardt, 1986; Mintzberg, 1978; Mintzberg & McHugh, 1985; Quinn, 1980), and the quantitative work that exists on the topic has relied on cross-sectional data (e.g., Bourgeois, 1985; Fredrickson, 1984; Miller, 1987). As a result, there are few statistically validated conclusions regarding the character and consequences of such processes over time. Fredrickson (1984) reported a positive relationship between the comprehensiveness of strategic decision processes and performance for firms in an industry with a stable environment, and Fredrickson and Mitchell (1984) reported a negative relationship between those variables in an unstable environment. Firms whose decision processes do not fit their environment presumably face the task of adapting them. However, untested theoretical arguments (Miller & Friesen, 1980a; Mintzberg, 1978; Starbuck, 1983; Tushman & Romanelli, 1985) have suggested that strategic decision processes are likely to exhibit considerable inertia, resisting all but modest change.

This article reports the results of a longitudinal extension of two earlier studies (Fredrickson, 1984; Fredrickson & Mitchell, 1984) on the comprehensiveness of strategic decision processes. The primary purposes were to

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determine (1) the extent to which levels of comprehensiveness had changed in the years since the original studies and (2) whether changes in selected characteristics of the organizations and executive teams studied were related to changes in comprehensiveness. A secondary purpose was to determine whether the previously established positive or negative relationships between comprehensiveness and performance held for the years since the original work. The study also provided an opportunity to explore potential differences in comprehensiveness across the two industries of interest.

THEORY DEVELOPMENT

Comprehensiveness

Researchers have offered numerous models of the strategy formulation process over the years, but two types remain most common. The dominant synoptic type is based on a rational model of decision making, and the incremental alternative purports to provide a more accurate characterization of how organizations actually make strategic decisions. An earlier article (Fredrickson, 1983) compared these two approaches, drawing on the work of Mintzberg (1973) and Lindblom (1959) in suggesting that the approaches differ on several major characteristics. The chief differences concern how comprehensive organizations are in making individual strategic decisions and how comprehensive they are in integrating those decisions into an overall strategy. Comprehensiveness was subsequently defined as "the extent to which an organization attempts to be exhaustive or inclusive in making and integrating strategic decisions" (Fredrickson, 1984: 447). Strategic decisions are those decisions that commit significant resources or set important precedents (Mintzberg, 1978; Narayanan & Fahey, 1982).

In spite of the prominent position of synoptic processes in the strategic management literature, authors in several fields have questioned their reality and advisability. For example, authors have frequently cited individual's cognitive limitations (Cyert & March, 1963; March & Simon, 1958) and the costs of information gathering (Braybrooke & Lindblom, 1970) as arguments against using comprehensive processes to make decisions. In addition, Quinn (1980) expressed numerous concerns about managers' ability to comprehensively integrate multiple decisions into a consistent whole. As discussed below, a more subtle view suggests that the appropriateness of comprehensive decision processes depends on the setting.

Several contributors to the strategy formulation literature have suggested that synoptic processes, which are based on a rational model, are appropriate for firms in stable environments (Anderson & Paine, 1975; Mintzberg, 1973; Nutt, 1976); they have also suggested that firms should use incremental processes when their environment is unstable. Since comprehensiveness is a major feature of synoptic models, this view implies that a comprehensive decision process will result in superior performance in a stable environment. In contrast, a noncomprehensive process, with its speed and flexibility, would be expected to have a similar effect in an unstable environment. Both assertions have received empirical support (Fredrickson,

1984; Fredrickson & Mitchell, 1984), but that support must be considered tentative because the research designs that generated it were static. Since this study tried to replicate those findings with longitudinal data, the first hypothesis is the same as one presented in the earlier studies:

Hypothesis 1: There will be a positive relationship between comprehensiveness and performance in a stable environment and a negative relationship between them in an unstable environment.

The above discussion links the comprehensiveness of strategic decision processes with organizational performance, so it also implies that changes in comprehensiveness may have important consequences. Therefore, it is critical to determine the extent to which levels of comprehensiveness change over time and to identify variables that are likely to produce increases or decreases in comprehensiveness. Those two issues were the primary focus of the present study.

Strategic Process Inertia

There is no need to change a firm's strategic decision-making process if it is appropriate for the firm's environment, if the firm is performing well, and if the environment does not change. However, problems arise if a strategic decision process is too comprehensive or noncomprehensive, and ill-advised actions result. Therefore, if we extend the adaptation view of strategic management (Chakravorthy, 1982; Hofer & Schendel, 1978; Miles & Snow, 1978) to strategic decision processes, top management's task becomes clear. For a highly comprehensive firm in an unstable environment, the appropriate adaptation would be for management to make the decision process less comprehensive. In contrast, just the opposite modification would be called for if a firm were noncomprehensive in a stable environment.

In spite of the apparent wisdom in adapting an organization's strategic process to make it more or less comprehensive, theoretical arguments have suggested that major changes are unlikely, or are very slow in coming (Miller & Friesen, 1980a,b; Mintzberg, 1978; Quinn, 1980; Starbuck, 1983; Steinbruner, 1974; Tushman & Romanelli, 1985; Yasai-Ardekani, 1986). The existence of a widely described feature of strategic decision making, which has been variously referred to as inertia, momentum, or simply habit, argues against all but relatively modest and incremental organizational change. For example, Mintzberg characterized strategy formation as the interplay of "an operating system, or bureaucracy, that above all seeks to stabilize its actions, despite the character of the environment it serves" (1978: 941). In a similar argument, Tushman and Romanelli suggested that over time, strategic processes "become routinized, commitment to established practices increases as groups become more rigid in their behavior patterns and decrease both the volume and diversity of information processed" (1985: 192). Finally, Starbuck argued that such decision making is nonadaptive because "behaviors get programmed through spontaneous habits, professional norms, education, training, precedents, traditions, and rituals as well as through formalized procedures" (1983: 93).

The preceding arguments suggest that a variety of forces combine to perpetuate the character of a firm's strategic decision process. Therefore, although that process may be inappropriate given the firm's environment, and in need of a major change, the way the firm makes and integrates strategic decisions is likely to be very similar year after year. This is not to say that strategic processes do not change; even strong proponents of an inertial view of organizations (e.g., Hannan & Freeman, 1984) have suggested that they do. However, most changes are expected to be modest, even over periods of several years (Mintzberg & Waters, 1982; Quinn, 1980). Couched in terms of comprehensiveness, the second hypothesis tests an inertial view of strategic decision processes:

Hypothesis 2: A firm's comprehensiveness at a given point in time will be highly and positively related to its comprehensiveness several years later, and will exhibit only modest change.

Sources of Change in Comprehensiveness

Even when researchers have described changes in strategic decision processes as modest (Miller & Friesen, 1980a; Mintzberg, 1973; Quinn, 1980), they have often attributed such changes to changes in other variables. Among those most frequently discussed are changes in a firm's perceived environment (Miller & Friesen, 1980a; Paine & Anderson, 1977; Staw, Sandelands, & Dutton, 1981); in its organizational structure (Fredrickson, 1986a; Miller, 1987; Pitts, 1980) and size (Lorange & Vancil, 1976; Mintzberg, 1973); and in its top management team (Starbuck, 1983; Tushman & Romanelli, 1985). However, because of potential validity problems with perceptual measures of change (Weick, 1979), we decided to use only variables for which we could develop objective change measures. Moreover, since the present study built directly on earlier work (Fredrickson, 1984; Fredrickson & Mitchell, 1984), we were limited to variables that had been measured there. As discussed below, the literature suggested that changes in three such variables—organizational size, executive-team (intrafirm) tenure, and executive-team membership (i.e., the level of continuity)—are likely to produce changes in comprehensiveness.

Before additional hypotheses are presented, it seems appropriate to discuss our reasons for focusing on the relationship between changes in these variables and comprehensiveness. Those reasons are theoretical and analytical. From a theoretical perspective, focusing on changes in both variables studied, as opposed to only the dependent variable, allows relationships to be specified in truly dynamic terms. For example, in considering organizational size and change in comprehensiveness, to us the most important question was not simply "Is there a relationship?" but rather, "As organizations get larger or smaller, what happens to comprehensiveness?" Such a question can only be answered by testing the relationship between changes in both variables. The analytical reason for focusing on changes in both variables was that it provided a more rigorous test and allowed us to draw the strong-

est conclusion, short of causality. Specifically, Granger and Newbolt (1974: 118) argued that because such an approach considers "first differences," it protects against spurious results from problematic error terms. Therefore, the hypotheses that follow specify the relationship between change in the three variables we have noted and change in comprehensiveness. Organizational size is discussed first.

Researchers have long argued that a firm's size affects its strategic decision-making process (Lorange & Vancil, 1976; Mintzberg, 1973). With regard to comprehensiveness, size appears likely to have an impact for two reasons. First, because a comprehensive process involves such activities as searching widely for information, conducting extensive analyses, and using a formal planning process, it is expensive. In contrast, a noncomprehensive process only needs a decision maker. This difference is readily apparent in Mintzberg's comparison of entrepreneurial and planning modes of strategy making, wherein he argued that firms using the latter "must be large enough to afford the costs" (1973: 50). In addition, as organizations grow, they tend to create increasingly differentiated and specialized subunits like planning staffs, as well as sophisticated information systems and formal controls (Tushman & Romanelli, 1985). Mintzberg (1978) suggested that the presence of such features encourages increasingly rational decision making. Therefore, the increased resources and other changes that typically accompany growth suggest our third hypothesis,

Hypothesis 3: There will be a positive relationship between change in organizational size and change in comprehensiveness.

The longer individuals are in a firm, the more socialized into its particular way of doing things they become (Thompson, 1967). Thus, executives' intrafirm tenure may affect the strategic decision process. For example, employees do not have to be at high levels to start getting inculcated in a firm's way of making decisions (Tushman & Romanelli, 1985; Van Maanen, 1976). And as they rise to such levels, their understandings become progressively more refined and more similar (Keisler & Sproul, 1982; Pfeffer & Salancik, 1978; Wagner, Pfeffer, & O'Reilly, 1984). This shared understanding of their firm's typical decision process can, in turn, lead executive-team members to rely on established decision-making policies and procedures (Staw et al., 1981), particularly those that have been successful (Cyert & March, 1963). Tushman and Romanelli argued that the longer executive team members have been in their firm, the more likely it is that "habit becomes a substitute for thought" (1985: 193) in strategic decision making. Since comprehensiveness is the extent to which strategic decision processes are exhaustive or inclusive, anything—including habit or expectations—that limits information search, the breadth of alternatives considered, and so on, should make a process less comprehensive. Hence, the socializing effects of tenure suggest our fourth hypothesis,

Hypothesis 4: There will be a negative relationship between change in executive-team members' intrafirm tenure and change in comprehensiveness.

The final hypothesis, on executive-team continuity, is based on a simple reality: a top management team is a group. Literature on groups suggests that those with stable, continuous membership become isolated from critical information sources. For example, as group continuity increases, communication patterns get routinized (Wagner et al., 1984), environmental perceptions become idiosyncratic (Meyer, 1978), and group members grow less responsive to information that challenges an existing decision process or its outcomes (Janis, 1972; Katz, 1982; Tushman & Romanelli, 1985). In addition, increased continuity leads to increased role definition among group members, which decreases interaction (Wagner et al., 1984). If these arguments are applied to the strategic decision-making behavior of executive teams, it appears that high levels of continuity should produce an increasingly non-comprehensive decision process. Therefore, it is not surprising that authors have argued that major changes in organizational direction require equally large changes in decision-making patterns (Roberts & O'Reilly, 1978; Wagner et al., 1984), which are most likely to occur when an entire executive team is replaced (Starbuck, 1983; Tushman & Romanelli, 1985). Thus, our final hypothesis,

Hypothesis 5: There will be a negative relationship between level of executive-team continuity and change in comprehensiveness.

METHODS

Overview

Questionnaire instruments used in two earlier studies (Fredrickson, 1984; Fredrickson & Mitchell, 1984) were readministered in 1986 in 45 firms in two industries. The environment of the paint and coatings industry, which was originally studied in 1982, had been identified as very stable. The other study, conducted in 1980, was in the forest products industry, which was considered to have an unstable environment. We also updated measures of environmental stability and data on firms' performance for the four or six years since the earlier studies.

Several executives in each firm read a decision scenario that described a firm in their industry faced with a major problem. They then responded to a series of questionnaire items designed to describe the process their firm would use if it faced the scenario situation; questions were designed to measure the comprehensiveness construct. We then aggregated responses within firms and used correlational analyses to test the relationship between the level of comprehensiveness found in the present study and that measured four or six years earlier. The correlational analyses also provided a general test of the hypothesized relationships between changes in organizational size and executive team tenure, level of team continuity, and change in comprehensiveness; a more rigorous test was conducted using multiple regression. We also used correlational analyses to test the relationship between comprehensiveness and performance during the subsequent four or six years. Finally, potential differences in comprehensiveness across industries were explored with multivariate analysis of variance.

Data

Of the 65 firms that participated in the earlier studies, 38 were in the paint and coatings industry (Standard Industrial Classification [SIC] 2851) and 27 were in forest products (SIC 2421). Those industries were originally chosen because Dess and Beard (1984), using multiple objective measures, had determined that their environments were highly stable (paint and coatings) or unstable (forest products).

The original firms were identified through a review of Dun and Bradstreet's *Million Dollar Directory* (1979, 1981) and *Middle Market Directory* (1979). Of the 38 paint and coatings firms, 34 were still operating as independent entities in the spring of 1986; the remaining 4 had been merged into larger firms. Of the independent firms, 28 (82 percent) agreed to have executives read the scenario and respond to the questions to characterize their firm's strategic decision process. The firms ranged in size from 20 to 18,000 employees (\bar{x} = 2,472, med. = 110, s.d. = 7,822) and were headquartered in Illinois, Indiana, Maryland, Ohio, Pennsylvania, northern Kentucky, and western New York. In the forest products industry, 20 of the original 27 firms were still operating independently six years later, and 17 (85 percent) agreed to have their executives participate. They ranged in size from 20 to 38,000 employees (\bar{x} = 5,783, med. = 210, s.d. = 11,986) and were headquartered in Oregon, Washington, and northern California. Of the 7 forest products firms no longer operating in their earlier form, 2 had merged into larger firms, 3 had been liquidated, and 2 had gotten out of manufacturing.

The 45 firms in the present study appeared to be representative of the original 65. For example, a comparison of the firms that participated in the follow-up study with those that did not indicated no significant differences in numbers of employees in either the paint and coatings industry (t = $-.67$, p = $.52$) or the forest products industry (t = 1.24 , p = $.23$). Similarly, a comparison of the overall measures of comprehensiveness obtained in the original studies indicated no differences in paint and coatings (t = $-.61$, p = $.56$) or forest products (t = $-.78$, p = $.44$). Regarding performance, the paint and coatings firms in the present study had higher (at the .10 level) average after-tax returns on assets (t = 1.86 , p < $.10$) for the five years covered in the original study than for the years covered in the present study. In contrast, the forest products firms did not differ significantly on performance (t = 1.21 , p = $.24$). Therefore, despite a modest performance difference between the present and previous data sets in paint and coatings, the follow-up group did not appear to be critically biased.

Interviews were conducted with the CEO of each firm, who was presented with a list of major decisions, such as whether to add a product line or build a new plant, and asked to identify the managers normally involved in making such decisions. Thus, CEOs provided their personal views of who comprised the top management team at their firm. This process resulted in 110 paint and coatings executives being chosen to participate; of that number, 103 (94 percent, an average 3.67 respondents per firm) read the scenario and answered the questions on how comprehensive their firm would be if it

faced the scenario situation. Respondents had worked in their firms an average of 21 years (*s.d.* = 11.56), and 76 percent had participated in the original study four years earlier. In the forest products firms, 60 executives were chosen and 56 (93 percent, 3.29 per firm) responded. These participants averaged 16 years (*s.d.* = 10.14) in their firms, and 50 percent had participated in the study six years earlier.

Scenarios and Comprehensiveness Questions

The body of the scenarios, and the questions used to assess the comprehensiveness construct in the present study, were the same as those used in the earlier studies. In both industries, the scenario described how the management of a hypothetical firm decided whether to build new, state-of-the-art production facilities. But in paint and coatings, a 16 percent drop in the firm's sales in 11 months was said to motivate the decision, while in forest products the scenario firm was motivated by its lack of success in obtaining timber from any source for two years.

The same instruments were used again to ensure that longitudinal comparisons of firms' strategic decision processes were valid. If different scenarios had been used, any changes in comprehensiveness might be due to their inherent differences, and could simply be an artifact of the instruments. Moreover, since four or six years separated the administration of the instruments, we considered a test-retest effect, whereby an earlier response would bias a later one, unlikely to occur. As reported in the Results section, validity checks and other data indicated that such bias was indeed not a problem.

Following the scenario were 43 Likert-type questions, 24 single-response and 19 multiitem, designed to assess the comprehensiveness of the firms' strategic decision processes. The questions were divided into four distinctly headed sections that were used to describe how comprehensive a firm was in (1) diagnosing the problem, (2) generating alternatives, (3) evaluating alternatives, and (4) integrating the decision into any overall strategy that might exist. Seven questions were common to each step of this theoretical decision process; 4 questions were unique to the situation diagnosis, alternative generation, and alternative evaluation steps, respectively; and 3 appeared only in the decision integration step. The Appendix describes the questions more completely and discusses additional validity checks of the comprehensiveness construct and the method's underlying assumptions; the earlier studies (Fredrickson, 1984; Fredrickson & Mitchell, 1984) also discuss the latter and the development of the questions in detail. We report results of the primary validity checks in the next section and have discussed the strengths and limitations of the research approach, including steps taken to overcome such potential problems as demand characteristics, elsewhere (Fredrickson, 1986b; Fredrickson & Mitchell, 1984).¹

¹ Instruments are available from the first author.

Calculation of Measures

Measures of comprehensiveness, change in comprehensiveness, change in organizational size and executive team tenure, and executive team continuity were calculated for each firm. We also updated performance measures and indicators of environmental stability for the years since the original studies.

Comprehensiveness. An overall measure of comprehensiveness was developed for each firm by (1) calculating the mean response of a firm's participants to each of the 43 questions, (2) taking the mean of the 10 or 11 questions specific to a particular step of the decision process to determine a firm-level score for each of the four steps, and (3) deriving the overall score as the mean of the four steps. Several tests reported in the Results section support these aggregations. As also reported there, scores for the four steps are highly correlated (average $\alpha = .94$) and exhibit considerable convergent validity but little discriminant validity. Therefore, we used only the overall measure of comprehensiveness to test the hypotheses.

Change in comprehensiveness. This measure was calculated by subtracting the overall score obtained years earlier from that obtained in the present study. Therefore, a positive change score indicates that a firm became more comprehensive and a negative score that it became less so.²

² The problems sometimes associated with change scores used in psychological measurement, such as instrument ceiling effects and selection-maturation interaction, were not an issue for the change measures used in the present study. The measures of change in size and in executive-team tenure, and of team continuity, capture tangible phenomena that can be objectively counted and converted to scales not subject to such problems. Moreover, the correlational and regression analyses used here accommodate differences in units.

With regard to the change-in-comprehensiveness scores, several points should be emphasized. We calculated these scores by subtracting the overall result obtained in the pertinent earlier study from that obtained in the present study. Those two measures of comprehensiveness were themselves developed by aggregating the responses of multiple respondents in each firm who described their firm's strategic decision process using 43 items. Aggregation tests in both industries indicated a reasonably high level of agreement among respondents in describing their firm's process (average $r = .65$), as they did in the earlier studies. This process provided a validity check of comprehensiveness and of change in comprehensiveness. Having the strategic decision process described by multiple respondents several years apart and achieving the reported levels of agreement both times indicate that this change score is derived from two measures with considerable interrater reliability. In addition, multiple items, themselves subject to a variety of highly supportive validity tests (average $\alpha = .95$) produced each of the overall measures. We also included a check that asked respondents to indicate the extent to which their firm's strategic process had become more or less comprehensive. The relationship between firms' change-in-comprehensiveness scores and this check was indeed significant (see Results).

Plots of the change-in-comprehensiveness scores (see Results) exhibit an even distribution of increases and decreases. Moreover, the aggregated comprehensiveness scores (Table 2) indicate that these changes were evenly distributed around means that did not themselves exhibit an apparent bias. Similarly, the mean response for the above check was 4.74, on a 7-point scale on which 4.0 indicated "no change." In combination, these data provide no evidence of the problems, such as ceiling effects, most likely to be of concern with such a change score.

Change in size. Most size measures tend to be correlated (Pugh, Hickson, Hinings, & Turner, 1969), as they were in the present study. For example, the correlation between number of employees and volume of sales was .85 or higher in each industry. Therefore, the number of full-time employees, a common indicator of size used in the earlier studies, provided the basis for the change measure. We measured change in size as the percentage increase or decrease in the number of full-time employees from the original to the present study.

Change in executive-team intrafirm tenure. Length of service is the common definition of tenure (Pfeffer, 1983), and tenure has been used as a measure of intrafirm socialization (Ouchi & Johnson, 1978). Since respondents in both the earlier studies and the present one specified the number of years they had worked in their firms, we computed change in intrafirm tenure by subtracting the average number of years executive-team members reported in the earlier study from the average number of years reported in the present study. A positive difference indicates an increase in the mean tenure of a firm's executive team; a negative difference signifies a decrease.

Executive-team continuity. Each firm's list of participants represented the CEO's characterization of the top management team at a particular time, so we used changes in that list as an indicator of executive-team continuity. Specifically, the measure of continuity was the proportion of a firm's executives whom the CEO identified in the present study who had also been identified in the first. The higher the proportion, the more continuity in an executive team.

Performance. A measure of economic performance used in the earlier studies—average after-tax return on assets adjusted for extraordinary items—was again used, this time for the four or six years since those studies. The periods of interest were therefore 1982–85 for paint and coatings and 1980–85 for forest products.

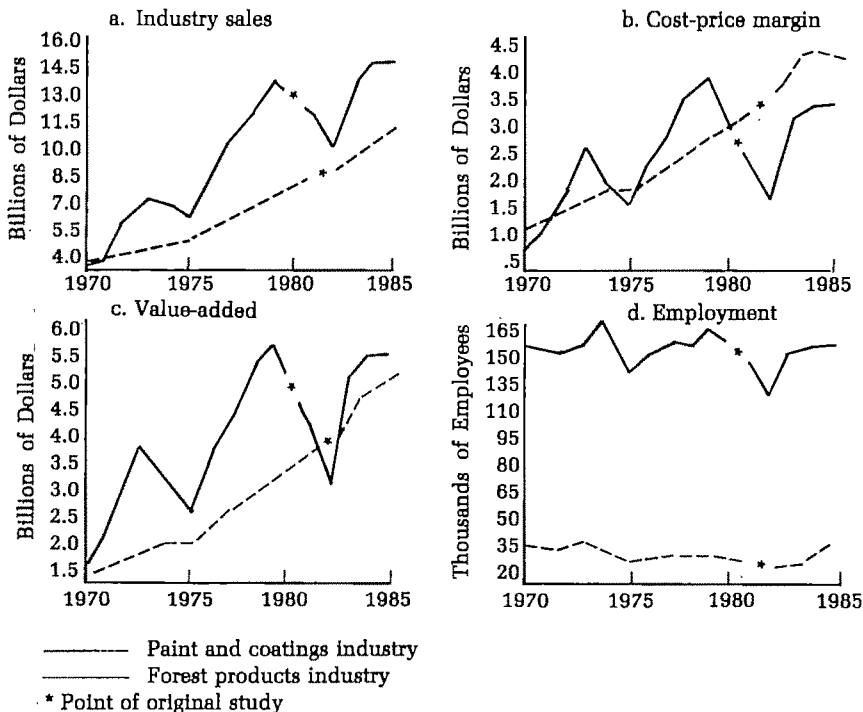
Validity checks. Results from a series of aggregation tests reported in the next section provided the primary validity checks of comprehensiveness and change in comprehensiveness; still others appear in the Appendix. However, we also used two additional checks. After respondents had answered all 43 questionnaire items and the four checks discussed in the Appendix (which also served to define comprehensiveness), we asked them to think about how important decisions were made in their firm several years earlier and to answer the question "How, if at all, has it changed?" The 7-point response scale for this item ranged from "much more comprehensive now" to "much less comprehensive now" and included an intermediate value for "no change." The degree of change characterized here could then be compared to that calculated from the scenario-based questions in the earlier and present studies to provide still another indication of whether we were, in fact, measuring change.

In both industries, we also used a scenario-related question to determine whether the situation portrayed was still considered strategic. Respondents were asked how important the scenario decision would be for their firm and

given an anchored scale ranging from "very important" (7) to "not important at all" (1).

Environmental stability. This research attempted to assess strategic decision processes over time in different environments. Therefore, it was valuable to enter the hypothesis-testing phase with a general understanding of the extent to which those environments had changed since the original studies. Dess and Beard (1984) previously determined that the environment of the paint and coatings industry was highly stable in the decade ending in 1979 and that the forest products industry's environment was unstable. As the four graphs composing Figure 1 show, a comparison of the four items that loaded most heavily on the stability dimension in Dess and Beard's work—industry sales, cost-price margin, value-added, and employment—indicates that sharp contrasts continued between the two industries in the interim years. In forest products, each item exhibited continued volatility: dramatic declines and subsequent increases as the industry struggled through an extremely difficult period. In contrast, for paint and coatings all but one of the same items showed modest but consistently linear increases; employment, the exception, showed a decrease and recent increase during the four years since the original study. Therefore, it appeared that the two

FIGURE 1
Changes in Indicators of Environmental
Stability, 1970–85



environments continued their previously established patterns of stability and instability.

RESULTS

Validity Checks

Before aggregating individuals' responses to an organizational level, we generated an intercorrelation matrix for each firm to determine the extent of agreement between each pair of respondents on the 43 questionnaire items. For the paint and coatings firms, the average intercorrelation ranged from .52 to .87, with a mean of .62. For forest products, the range was from .53 to .89 and the mean was .65. These data suggest a reasonably high level of agreement among respondents and support the subsequent aggregation of individual responses to produce an organization-level score on each of the 43 questions.

The convergent validity of the 19 multiitem composites was then assessed by computing Cronbach's alpha for each. For the paint and coatings firms, the alphas ranged from .69 to .92 and had a mean of .77. Similarly, for the forest products firms, they ranged from .57 to .86, with a .73 mean. Given these results and the others reported in the previous paragraph, we proceeded to the organizational level, using the 24 single-response and 19 multiitem composites (Nunnally, 1967).

Cronbach's alpha was also computed for each of the four steps of the decision process using the 10 or 11 questions that pertained to the corresponding section of the scenario. Among the paint and coatings firms, this analysis produced four alphas ranging from .69 to .83; in the forest products firms, the range was from .76 to .86. In addition, an analysis of the four composites yielded an alpha of .96 in the paint and coatings firms and .93 in forest products. Such highly correlated measures produce misleading results when they are used individually; for example, the regression coefficients can be unstable. On the other hand, such measures provide strong support for using a single overall measure of the comprehensiveness construct for each firm (Nunnally, 1967). In addition, since the overall measures obtained here and in the earlier studies provided the basis for computing change in comprehensiveness, these results also support the validity of that measure.

Other checks. An additional check of change in comprehensiveness was also used. Specifically, we tested the relationship between change in firms' overall comprehensiveness scores and the change described by participants in response to the question on how much more or less comprehensive their firm was compared to years earlier ($\bar{x} = 4.74$, $s.d. = .83$). Results for the firms in both industries indicate a significant relationship ($N = 45$, $r = .40$, $p < .01$) between these two measures. Thus, it appears that our measures captured change in comprehensiveness.

Respondents also indicated that the scenario decision was still important for their firm. The mean response among paint and coatings firms was 6.72 (maximum = 7), which was not significantly different ($t = -.70$, $p =$

.49) from the mean response of four years earlier. The forest products firms yielded similar results, with a mean response (6.60) that did not differ significantly ($t = .04$, $p = .96$) from that obtained six years earlier.

Means and standard deviations for the primary variables, primary validity checks, and other checks appear in Table 1. Data are presented for both the present study and the earlier studies.

Hypotheses Testing

Hypotheses 2 through 5, on the extent of change and its likely sources, provided the primary focus of this research. We partially tested the second hypothesis—which stated that a firm's comprehensiveness at a given point

TABLE 1
Means and Standard Deviations^a

Variables	Paint and Coatings	Forest Products
Primary measures		
Comprehensiveness		
Present study	3.85 (0.37)	3.67 (0.69)
Earlier study	3.85 (0.38)	3.77 (0.57)
Performance		
Present study	0.08 (0.05)	0.02 (0.08)
Earlier study	0.08 (0.04)	0.09 (0.04)
Change in		
Comprehensiveness	0.00 (0.30)	-0.10 (0.46)
Organizational size	0.11 (0.29)	-0.12 (0.42)
Executive-team tenure	1.25 (6.82)	-4.52 (11.16)
Performance	0.00 (0.03)	-0.07 (0.06)
Executive team continuity	0.79 (0.25)	0.60 (0.38)
Primary validity checks		
43-item intercorrelation		
Present study	0.62 (0.08)	0.65 (0.04)
Earlier study	0.61 (0.07)	0.63 (0.09)
Alpha for 19 multitem questions		
Present study	0.77 (0.06)	0.73 (0.09)
Earlier study	0.74 (0.05)	0.71 (0.08)
Alpha for four decision-step composites		
Present study	0.78 (0.01)	0.81 (0.03)
Earlier study	0.79 (0.01)	0.82 (0.02)
Overall process alpha		
Present study	0.96 (0.02)	0.93 (0.03)
Earlier study	0.94 (0.01)	0.96 (0.02)
Other checks		
Importance of decision		
Present study	6.72 (0.44)	6.60 (0.62)
Earlier study	6.60 (0.46)	6.40 (0.84)
Change in comprehensiveness	4.71 (0.72)	4.80 (1.01)

^a For the present study, $N = 45$, with 28 firms in paint and coatings and 17 in forest products. For the earlier study, $N = 65$, with 38 in paint and coatings and 27 in forest products. Standard deviations are in parentheses.

in time will be highly and positively related to its comprehensiveness several years later, and exhibit only modest change—by computing Pearson correlations between the overall comprehensiveness scores of firms participating in the present study and the corresponding scores for the same firms obtained four or six years earlier. Among paint and coatings firms, the overall measure of comprehensiveness was indeed highly and positively related ($N = 28$, $r = .69$, $p < .01$) after four years. Similarly, among the forest products firms, the association was strong ($N = 17$, $r = .74$, $p < .01$) over the six-year period. These results support the first part of the hypothesis and indicate that firms tended to remain at a level of comprehensiveness similar to that found in the original studies.

Although the above results suggest a strong relationship between the earlier and present measures, they also indicate that change took place. Specifically, the overall comprehensiveness measure obtained in the original studies explained about half the variance observed four or six years later. Moreover, it is not inconsistent to assert that strategic processes exhibited considerable inertia yet also changed. As noted earlier, Hannan and Freeman (1984) argued that the issue of organizational inertia is not one of change versus no change. Rather, it is a question of how large and common such change is; an inertial view suggests that changes will typically be modest, even over periods of several years. To test the second part of the hypothesis, we plotted the change-in-comprehensiveness scores for each industry as histograms, displayed in Figure 2.

In both the original and present studies, the highest possible score for the measure of a firm's overall comprehensiveness was 7, extremely comprehensive, while the lowest was 1, extremely noncomprehensive; thus, plus or minus 6 represented the largest possible change. The histograms reveal that in paint and coatings, changes ranged from an increase of 0.60 to a decrease of -0.45 and had a mean of .00 (see Table 1). Similarly, in the forest products firms the range was from an increase of 0.62 to a decrease of -1.25 ; the mean change in comprehensiveness was $-.10$, a decrease of one-tenth of a point on a six-point scale. Therefore, we believe it is accurate to conclude that the comprehensiveness of strategic decision processes exhibited considerable inertia, with only modest incremental change. The restricted range of change scores also provides a demanding test of the association between change in comprehensiveness and the hypothesized sources of that change. It should be noted that firms that were low performers in the earlier studies were no more likely to change than were high performers. Specifically, the relationship between change in comprehensiveness and firms' performance in the original studies was not significant in either paint and coatings ($N = 28$, $r = -.07$, $p = .36$) or forest products ($N = 17$, $r = .16$, $p = .29$).

The three hypotheses regarding likely sources of change in comprehensiveness (change in size or tenure, and continuity) were first tested with zero-order correlations. We tested both groups of firms together because the effects were hypothesized to be universal. Table 2 presents descriptive sta-

FIGURE 2
Distribution of Change in Comprehensiveness Scores

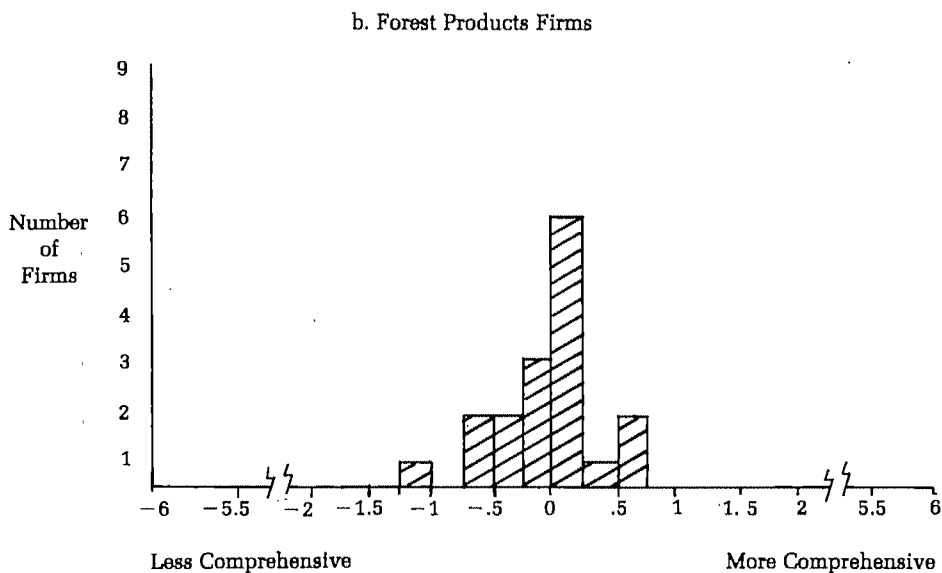
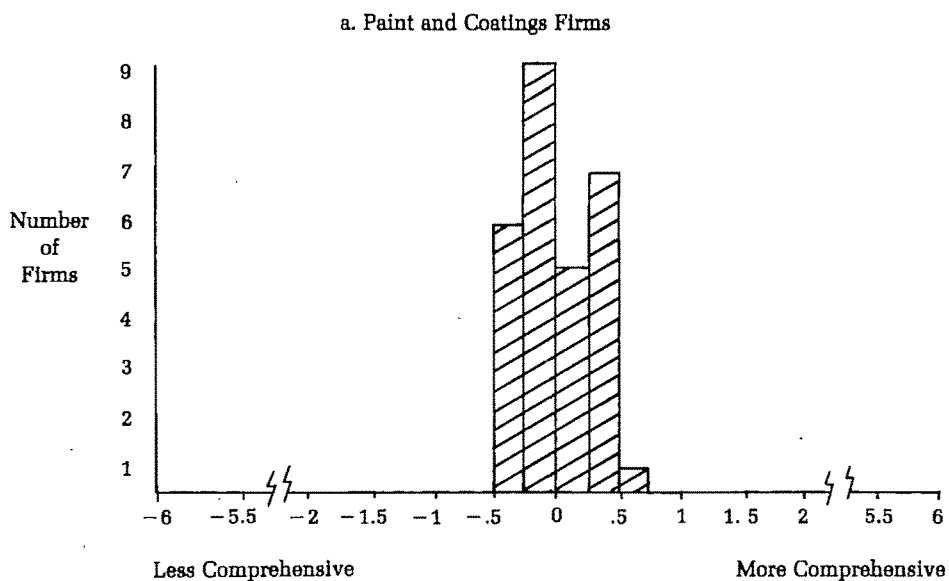


TABLE 2
Means, Standard Deviations, and Correlations
Among Change in Comprehensiveness and the Source Variables^a

Variables	Means	Standard Deviations	1	2	3
1. Change in size	0.02	0.37			
2. Change in team tenure	-0.85	8.85	-.05		
3. Executive-team continuity	0.72	0.31	.15	.45**	
4. Change in comprehensiveness	-0.04	0.37	.34**	.50**	.37**
Sign of hypothesized relationship			+	-	-

^a $N = 45$.

* $p < .05$

** $p < .01$

tistics and correlations among the variables. The last line in the body of the table indicates that all the hypothesized relationships were significant at the .01 level or better, though not always in the expected direction. For example, change in size exhibited the predicted positive relationship with change in comprehensiveness ($N = 45$, $r = .34$, $p < .01$). On the other hand, change in executive-team tenure ($N = 45$, $r = .50$, $p < .01$) and the level of executive-team continuity ($N = 45$, $r = .37$, $p < .01$) were strongly related to change in comprehensiveness, but the positive sign of those relationships was not what we had predicted. Industry-level analyses (not presented) produced the same pattern of results.

The results just described specify the associations between changes in individual variables and comprehensiveness, but they do not capture the variables' combined effects. Therefore, we used multiple regression analysis, with change in size and in executive-team tenure, and team continuity, predicting change in comprehensiveness. As the first column of Table 3 indicates, an equation with three variables explained 40 percent of the variance in change in comprehensiveness. However, the coefficient for executive-team continuity was not significant. (Results shown in Table 2 indicated that continuity was significantly correlated with change in team tenure.) In an attempt to find the most efficient solution, we dropped team continuity from the analysis. As the second column of Table 3 indicates, the resulting two-variable equation explained almost as much variation (37 percent) as the three-variable equation. Therefore, it appears that executive-team tenure and organizational size offer a reasonably strong yet parsimonious model of change in the comprehensiveness of strategic decision processes.

A secondary purpose of this study was to determine whether the relationships established in the earlier studies between comprehensiveness and performance held for the subsequent four to six years. As a first step, the hypothesized positive relationship in a stable environment was tested with the paint and coatings firms. Controlling for size, we computed partial correlations between the overall measure of comprehensiveness obtained in the

TABLE 3
Multiple Regression Coefficients, with Change in Comprehensiveness
as the Dependent Variable^a

Variables	Complete Model	Parsimonious Model
Change in executive-team tenure	.0177** (.0058)	.0211** (.0049)
Change in organizational size	.3086** (.1462)	.3825** (.1278)
Executive-team continuity	.1868 (.1708)	
Constant	-.1518 (.1329)	.0458 (.0572)
R ²	.40**	.37**

^aN = 45. Standard errors are in parentheses.

* $p < .05$

** $p < .01$

original study and average after-tax return on assets for the years since that study. This relationship was again positive and significant ($N = 28$, $r = .48$, $p < .01$). We then conducted the same analysis with the forest products firms to test for a negative relationship in an unstable environment. Partial correlations again indicated a significant negative relationship ($N = 17$, $r = -.42$, $p < .05$). Fisher R-to-Z tests across the two groups of firms indicated that the results obtained in the paint and coatings industry differed significantly (at the .01 level) from those in forest products both in the present study and the earlier studies.

A more dynamic test was also conducted by investigating the relationship between change in comprehensiveness and change in performance, which was measured as average ROA for the years of the present study, less that for the earlier one. The theoretical and analytical advantages of such a test were discussed earlier. Once again, the relationship was positive ($N = 28$, $r = .23$, $p < .10$) and significant in paint and coatings, and it was negative ($N = 17$, $r = -.55$, $p < .05$) in forest products.

Industry Differences

Although it was not an a priori purpose of this research, the present study offered a unique opportunity to compare the comprehensiveness of strategic processes in two industries and environments. Therefore, we used multivariate analysis of variance to explore potential differences.

With regard to the measures used in this analysis, two clarifications are in order. First, readers may recall that although the scenarios used in both industries required respondents to indicate how their firm would decide whether to build new, state-of-the-art production facilities, different problems motivated that decision in the two industries. Specifically, the scenario used in paint and coatings described a firm that had experienced a 16 percent sales decline in 11 months; in forest products, the scenario firm had

been unsuccessful in obtaining timber from any source for two years. Thus, respondents in the two industries were not dealing with exactly the same situation when they answered questions that pertained to situation diagnosis. Therefore, we did not use the 11 items in that portion of the questionnaire in subsequent analyses. In addition, of the remaining 32 items, 12 of the multiitem questions had subitems that differed across industries. They too were eliminated, leaving 20 common items for this exploratory analysis.

To investigate potential across-industry differences, we compared responses obtained in the initial paint and coatings study (Fredrickson, 1984) with those from the initial study in forest products (Fredrickson & Mitchell, 1984) by conducting a MANOVA on the remaining 20 items. The resulting multivariate test of significance (Wilks's lambda exact F) indicated significant differences ($F_{20,44} = 9.99, p < .001$) across the two industries. We then examined the univariate ANOVA for each item to determine which actions best distinguished the two groups.

On 11 of the 20 items, firms in one industry were significantly more comprehensive than those in the other. A review of mean responses (Table 4, first three columns) indicates that the paint and coatings firms were more comprehensive in the assignment of responsibility and primary method of analysis used in all three steps; they were also more comprehensive in the breadth of alternative generation techniques and in the number of years they would project calculations into the future. The forest products firms were more comprehensive only in the absolute amount of out-of-pocket expenditures they would willingly incur in making the decision.

We then conducted the same analysis across the two industries using responses obtained in the current replication. This analysis also produced a multivariate test (Wilks's lambda) that indicated significant differences ($F_{20,24} = 5.61, p < .001$). In addition, on 9 of 20 items firms in one industry were significantly more comprehensive (Table 4). A review of means again identified the paint and coatings firms as more comprehensive in the assignment of primary responsibility in all three steps, in the primary method used in two, and in the number of years calculations would be projected into the future. As before, the forest products firms indicated a willingness to commit significantly more dollars to the strategic decision process.

DISCUSSION

Primary Conclusions

A primary conclusion of the present research was that levels of comprehensiveness tended to persist over several years. Some change did occur, but it was typically modest. Therefore, the strategic processes of the firms studied exhibited considerable inertia. Although little change would be called for if all the firms had (1) good performance and (2) a good fit between their environment and strategic decision process, that was not the case. From the original studies, we knew that there was enough variance in overall comprehensiveness to allow significant yet opposite relationships

TABLE 4
Means and Main Effects of Environment and Industry

Decision Steps	Original Studies			Present Study		
	Means ^a		F	Means ^b		F
	Paint and Coatings	Forest Products		Paint and Coatings	Forest Products	
Alternative generation						
Assignment of primary responsibility	4.11	3.15	19.23***	4.08	2.77	21.68***
Willingness to get outside information	2.38	2.56	1.38	2.58	2.63	0.14
Primary method used	3.51	2.97	4.72**	3.56	3.03	2.38
Number of employees involved	2.44	2.43	0.00	2.48	2.64	0.36
Out-of-pocket expenses	2.05	5.51	34.98***	2.08	4.06	8.88**
Basis for dropping alternatives	2.78	2.90	0.35	2.74	2.71	0.01
Breadth of alternative generating techniques	5.37	5.06	2.77*	5.37	5.14	1.18
Alternative evaluation						
Assignment of primary responsibility	4.12	3.29	19.37***	3.91	2.85	13.34***
Willingness to get outside information	2.66	2.66	0.00	2.50	2.68	0.65
Primary method used	4.06	3.25	10.05***	4.08	3.19	5.71**
Number of employees involved	2.51	2.78	1.41	2.86	2.91	0.01
Out-of-pocket expenses	2.40	7.49	57.93***	2.72	4.17	7.39**
Number of years calculations projected	4.82	2.96	31.76***	4.59	2.62	20.98***
Decision integration						
Assignment of primary responsibility	3.94	3.09	19.71***	3.67	2.66	11.65***
Willingness to get outside information	2.24	2.28	0.06	2.10	2.29	0.62
Primary method used	3.59	2.96	5.50**	3.63	2.99	3.93*
Number of employees involved	2.79	2.88	0.11	3.07	2.98	0.05
Out-of-pocket expenses	2.15	4.79	30.46***	2.34	3.22	3.71*
Involvement of affected departments	3.14	3.48	2.14	3.05	3.29	0.47
Breadth of integrative techniques used	5.51	5.59	0.17	5.56	5.17	2.32

^a For the paint and coatings industry, *N* = 38; for forest products, *N* = 27.

^b For the paint and coatings industry, *N* = 28; for forest products, *N* = 17.

* *p* < .05

** *p* < .01

*** *p* < .001

with performance to be established in the two industries; and those industries continued to be generally stable or unstable. Moreover, as was reported earlier, there was no relationship between firms' performance in the original studies and subsequent change in comprehensiveness. Therefore, the present study validates statistically the largely untested arguments of authors who have suggested that strategic decision processes tend to resist all but modest change (Miller & Friesen, 1980a; Mintzberg, 1978; Quinn, 1980; Starbuck, 1983; Tushman & Romanelli, 1985; Yasai-Ardekani, 1986).

The second major conclusion was that changes in selected characteristics of organizations and executive teams were significantly related to changes in comprehensiveness; this was the case even though the modest changes in comprehensiveness provided a very demanding test. For example, the present study provides evidence that organizational size has important implications for strategic decision processes. Consistent with Mintzberg's (1973) observation that firms evolve to a planning mode as they grow, experience here indicates that an increasingly comprehensive decision process indeed accompanies an increase in size. In firms that got smaller, comprehensiveness declined.

The results also indicate a significant, positive relationship between dynamic features of executive teams and comprehensiveness. We hypothesized negative relationships largely on the basis of theories of organizational socialization (Thompson, 1967; Van Maanen, 1976) and of group decision making (Janis, 1972; Katz, 1982) and interaction (Wagner et al., 1984) that have not often been tested with top management teams and strategic decisions. Therefore, the present study suggests that the effects of tenure and group composition on decision processes are substantially different at the strategic level, and that theoretical extrapolations of phenomena observed at the operating level (Starbuck, 1983; Tushman & Romanelli, 1985) may need refinement. It seems likely that such theory simply does not accommodate the contextual complexities of strategic processes. In addition, arguments presented below suggest that our measures of executive-team tenure and continuity may have actually captured general forces that encourage increased comprehensiveness and rationality.

Several authors have suggested that organizations are under increasing internal and external pressure to indicate that their actions are the result of a rational decision process. March and Sevón (1984) and Hannan and Freeman (1984) made this point; the latter argued that "norms or procedural rationality are pervasive in the modern world" and that "organizational legitimacy . . . depends on ostensible conformity to these norms" (1984: 153). Similarly, DiMaggio and Powell (1983) suggested that the steadily increasing professionalization of management fuels this trend. The drive for professionalism has, in turn, created what Steinbruner called an "intellectual momentum" (1974: 111) biased in favor of rational decision making.

In retrospect, this study's combined results on the sources of change in comprehensiveness (tenure, continuity, and size) appear to present a cohesive pattern. Moreover, that pattern offers a reasonable explanation for a

phenomenon that has been the subject of speculation in the literature on strategic processes. For example, Mintzberg (1978) suggested that strategic decision processes generally exhibit a "bureaucratic momentum" that propels firms to progressively higher levels of rationality. Similarly, Miller and Friesen (1980b) hypothesized that such momentum, unless disrupted by an organizational "revolution," will cause strategic processes that already tend to be rational to become progressively more so. Our results indicate that increases in executive-team tenure, which tend to be accompanied by high levels of team continuity, and increases in organizational size, are associated with increased comprehensiveness. Moreover, it seems reasonable to assume that as time passes in firms that are not experiencing turmoil, executives are increasingly socialized, the top management team remains intact, and the firm grows. Therefore, it appears that these conditions, which are natural by-products of an organization's continued evolution, contribute to what we call creeping rationality.

Creeping rationality is likely caused by increasing expectations of rationality (DiMaggio & Powell, 1983; Hannan & Freeman, 1984; March & Sevon, 1984; Steinbruner, 1974) and may be manifest in the bureaucratic structures that typically accompany growth (Miller, 1987; Mintzberg, 1979). However, the potential importance of creeping rationality stems from the fact that the character of a firm's strategic decision process is ultimately reflected in the firm's actions (Miller, 1987). For example, Quinn (1980) argued that the "institutionalized incrementalism" of such processes is a major reason why new strategies often take up to ten years to emerge.

It is important to recognize that our results do not suggest that creeping rationality is a universal phenomenon. All the firms studied did not exhibit it. On the contrary, those that got smaller and assembled new executive teams composed of managers who were less socialized than their predecessors became less comprehensive. Such changes in the executive team and firm size may be critical to overcoming the effects of creeping rationality in strategic decision processes and, ultimately, incrementalism in strategic actions.

Additional Conclusions

Evidence from the present study also extends the results of the earlier work (Fredrickson, 1984; Fredrickson & Mitchell, 1984) by showing that comprehensiveness, a characteristic of rational decision processes, and performance were significantly related for the four or six years after the original studies. As hypothesized, that relationship was again positive in the stable environment of the paint and coatings industry and negative in the unstable environment of the forest products industry. Associations between changes in these variables followed the same pattern. In combination, these results extend the earlier work longitudinally and dynamically and move close to establishing causality in the relationship between comprehensiveness and performance.

It is important to note that the above relationships were established in

industries whose performance differed dramatically. Mean performance for the paint and coatings firms was 8 percent, with no change since the earlier study. In forest products, which experienced great difficulty in the interim years, the mean return on assets was only 2 percent, a decline of 7 percentage points from the time of the earlier study. The establishment of significant relationships between changes in comprehensiveness and performance in two settings, one that saw no change in mean performance and another that saw a dramatic decline, further illustrates the importance and apparent sensitivity of this construct.

The final conclusion from the present study concerns across-industry differences. In general, the strategic processes used in the paint and coatings firms tended to be more comprehensive, on the common items, than those in forest products when both types of firms were making the same decision—whether to build new, state-of-the-art production facilities. Several authors (Anderson & Paine, 1975; Hambrick & Snow, 1977; Miller & Friesen, 1980a; Mintzberg, 1973) have argued that the decisions of firms in stable environments are likely to be made using rational processes, but that those of firms in unstable environments will be incremental. Since comprehensiveness is a measure of rationality, the reported results seem to support this view. However, the present study was not designed to rule out alternative explanations for across-industry differences; the most obvious one is discussed below.

Although firms in both industries faced the same decision, different problems motivated that decision: in paint and coatings, a decline in sales, and in forest products, an inability to get timber. This difference is important in light of the arguments of several authors (Dutton & Duncan, 1987; Dutton, Fahey, & Narayanan, 1983; Mintzberg, Raisinghani, & Theoret, 1976) that the early stages of a strategic decision process can influence what is done in the balance of that process. Therefore, if the two scenario problems differed on some dimension, such as urgency, that difference not only could create across-industry differences in the comprehensiveness of the situation diagnosis step (which was dropped from the analyses); it might also have a framing effect that could influence the level of comprehensiveness in the balance of the process. However, it is highly unlikely that this study would have produced the pattern of relationships reported—(1) significant, yet opposite relationships between comprehensiveness and performance in the two industries, (2) statistically indistinguishable differences in the relationship between the original and present measures of comprehensiveness in the two industries, and (3) the same pattern of significant relationships between change in comprehensiveness and its likely sources in the two industries—if there were indeed such an across-industry confound.

Limitations

In investigating likely sources of change in comprehensiveness, the present study considered only variables assessed in the earlier studies whose changes could be measured objectively. Therefore, we did not test

relationships with other potential sources of change, such as perceived environment (Miller & Friesen, 1980a; Paine & Anderson, 1977; Staw et al., 1981) and organizational structure (Fredrickson, 1986a; Miller, 1987; Pitts, 1980). Because we obtained measures of comprehensiveness several years apart, it is also not known whether more radical changes (Miller & Friesen, 1980b; Tushman & Romanelli, 1985) took place in the interim. Moreover, although the study included firms in different environments, only two environments are represented, with a single industry in each. Therefore, care must be taken in generalizing from these results. Industries such as forest products and semiconductors may both be unstable, but critical differences, such as in environmental complexity, may intervene. Finally, although the present study was longitudinal, it did not satisfy the assumptions of synchronicity or stationarity of a cross-lagged panel design (Kenny, 1975). Therefore, it is important to emphasize that we established numerous dynamic relationships, but not causality.

Concluding Remarks

In the introduction, we noted that research on strategic decision processes has rarely been both longitudinal and quantitative. As a result, few conclusions regarding the character and consequences of such processes over time have been statistically validated. However, through a longitudinal and quantitative approach, this research obtained statistical evidence that supports several critical but largely untested arguments, including the inertia of strategic processes, the effects of size, and across-industry differences, and challenges still others, such as the directional effects of executive-team tenure and continuity. In addition, this research extends prior findings on the relationship of comprehensiveness and performance and highlights a strategic process phenomenon—creeping rationality—that has implications for strategic actions. The evidence reported here suggests that the comprehensiveness of strategic decision processes exhibits considerable inertia, with only modest, but important, change occurring. Moreover, it appears that changes in certain characteristics of executive teams and organizations are critical to producing changes in comprehensiveness. Even modest changes in comprehensiveness may, in turn, be reflected in changes in performance. And firms in different environments may use very different processes in making the same decision. We hope that other investigators will attempt to replicate and extend the reported findings and overcome the limitations of the present study.

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APPENDIX

Comprehensiveness questions. For each of the four steps of the decision process, respondents were asked about the following: assignment of primary responsibility, willingness to go outside for information, primary method of decision making, number of employees involved, and amount of direct out-of-pocket expenses (single-item questions, scaled from 1 to 5 or 7); we also asked about breadth of participants' experience and breadth of outside information sources used for each step (multiitem composites, scaled from 1 to 7).

In addition, we asked about the following four specific steps—(1) situation diagnosis: number of years of data reviewed (single-item), breadth of problem causes considered, of analysis techniques used, and of factors considered important in determining the cause (multiitem); (2) alternative generation: primary basis for dropping alternatives (single-item), breadth of solutions considered, of techniques used to generate alternatives, and factors used in eliminating alternatives (multiitem); (3) alternative evaluation: how many years calculations would be projected (single-item), breadth of criteria used in evaluation, of reports and summaries prepared, and of analyses conducted (multiitem); (4) decision integration: involvement of affected departments or areas (single-item), breadth of integrative techniques used, and of decisions integrated with the scenario decision (multiitem).

Validity checks. If a firm's strategic decision process is a pattern of behavior (Barnard, 1938; Weick, 1979), the characteristics of that process will tend to be consistent across decisions perceived as strategic, which makes it possible to study issues like comprehensiveness without having to consider multiple decisions in a firm. We used four summary construct validity questions to (1) obtain multiple measures of the comprehensiveness construct and (2) test the assumption that comprehensiveness is consistent across decisions. In such questions, which appeared immediately after the 43 questionnaire items, the term comprehensive made its only appearance in the instrument; those questions asked respondents to indicate how comprehensive their firm usually was in making important decisions. The first question said "A firm that is very comprehensive in determining the cause of a major problem might form a group of several members, make extensive use of outsiders, conduct extensive analyses, allow unlimited expenses, involve people with diverse backgrounds, and consider all possible causes. On the other hand a very noncomprehensive firm might rely on the ideas and experience of one or two employees." Respondents were asked "Which best describes YOUR FIRM?" and were offered an anchored scale from "very comprehensive" (7) to "very noncomprehensive" (1). Similar questions were offered for the three remaining steps of the decision process. The word "usually" implied consistency, so its presence could be established by testing the relationship between responses to these questions and the process as characterized in the scenario-based questions.

The relationship between the four step composites and the four construct validity questions discussed above was assessed to test the assumption of consistency across decisions. Responses to the construct validity questions exhibited strong correlations with the corresponding composites. With paint and coatings reported first and forest products second, for situation diagnosis, $N = 28$, $r = .60$, $p < .01$ and $N = 17$, $r = .62$, $p < .01$; for alternative generation, $r = .72$, $p < .01$ and $r = .76$, $p < .01$; for alternative evaluation, $r = .86$, $p < .01$ and $r = .79$, $p < .01$; and for decision integration, $r = .87$, $p < .01$ and $r = .89$, $p < .01$. We computed a single measure of comprehensiveness as the mean of the four construct validity questions, and it exhibited a strong relationship with the overall measure developed from the scenario-based questions in both paint and coatings ($r = .84$, $p < .01$) and forest products ($r = .68$, $p < .01$). These results mirror those obtained in the original studies (Fredrickson, 1984; Fredrickson & Mitchell, 1984) and suggest that strategic process characteristics like comprehensiveness tend to be consistent across decisions and that the profiles developed in response to the scenarios were representative of firms' strategic decision processes.

James W. Fredrickson is currently an associate professor of business administration in the Graduate School of Business, Columbia University, but in December of this year he will join the Graduate Business School faculty of the University of Texas, Austin. He earned his Ph.D. degree in business from the University of Washington. His current research interests include strategic decision making and a variety of issues relating to top management teams and CEOs.

Anthony L. Iaquinto is a doctoral candidate in the Graduate School of Business, Columbia University, where he previously earned his M.B.A. degree. His research interests include strategic decision making, the significance of top-level executives, and international business.

MAKING FAST STRATEGIC DECISIONS IN HIGH-VELOCITY ENVIRONMENTS

KATHLEEN M. EISENHARDT
Stanford University

How do executive teams make rapid decisions in the high-velocity microcomputer industry? This inductive study of eight microcomputer firms led to propositions exploring that question. Fast decision makers use more, not less, information than do slow decision makers. The former also develop more, not fewer, alternatives, and use a two-tiered advice process. Conflict resolution and integration among strategic decisions and tactical plans are also critical to the pace of decision making. Finally, fast decisions based on this pattern of behaviors lead to superior performance.

In October 1984, Gavilan Computer filed for bankruptcy protection under Chapter 11. Despite a \$31 million stake from venture capitalists, Gavilan experienced delays and indecision that ultimately cost the firm its early technical and market advantages. The firm's leading-edge technology became a "me too" one and competitors flooded its empty market niche. As the firm died, one executive mourned: "We missed the window" (Hof, 1984).

This story is not unusual in fast-paced settings like the microcomputer industry. The tumult of technical change places a premium on rapid decision making. Yet, although decision speed seems to affect firm performance in such environments (Bourgeois & Eisenhardt, 1988) and is a key characteristic differentiating strategic decisions (Hickson, Butler, Gray, Mallory, & Wilson, 1986), there has been little research on fast strategic decision making.

This article explores the speed of strategic decision making. In an earlier study (Bourgeois & Eisenhardt, 1988), my colleague and I linked fast strategic decision making to effective firm performance. In a second study on politics (Eisenhardt & Bourgeois, 1988), we noted that politics seemed to

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slow decision making. However, neither study addressed how executives decide quickly. The present study extends the previous work by exploring how executive teams actually make fast decisions.

This article is organized around two research questions: (1) How are fast strategic decisions made? and (2) How does decision speed link to performance? The setting is the high-velocity microcomputer industry. In a high-velocity environment, changes in demand, competition, and technology are so rapid and discontinuous that information is often inaccurate, unavailable, or obsolete (Bourgeois & Eisenhardt, 1988). During this research (1984–85), the microcomputer industry underwent substantial technological changes, such as the introduction of the UNIX operating system, 64K RAM memory, and RISC computer architecture, as well as substantial competitive change, such as the entry of IBM, the decline of Texas Instruments, and double-digit demand growth (Bell, 1984).

The results reported here are a set of propositions challenging traditional views of strategic decision making. The evidence suggests that fast decision makers use more, not less, information, than do slow decision makers. They also develop more, not fewer, alternatives. In contrast to current literature, this study found that centralized decision making is not necessarily fast, but a layered advice process, emphasizing input from experienced counselors, is fast. The findings also indicate that conflict resolution is critical to decision speed, but conflict per se is not. Finally, integration among strategic decisions and between decisions and tactical plans speeds, not slows, decision making. Such integration helps decision makers cope with the anxiety of high-stakes decision making. Overall, fast decision making allows decision makers to keep pace with change and is linked to strong performance. A pattern of emotional, political, and cognitive processes that are related to rapid closure of major decisions emerged from this research. The empirical grounding of those ideas is the subject of this article.

BACKGROUND

There are several perspectives on how rapid strategic decisions are achieved. One research stream emphasizes the idea that a high level of comprehensiveness¹ slows the strategic decision process. According to this perspective, consideration of few alternatives, obtaining input from few sources, and limited analysis lead to quick decisions (Mintzberg, 1973; Nutt, 1976). For example, Fredrickson and Mitchell (1984) argued that a process that is less comprehensive speeds decisions. Similarly, Schweiger, Sandberg, and Ragan (1986) noted that extensive analysis in dialectical inquiry is

¹ "Comprehensiveness is a measure of rationality and refers to the extent to which organizations attempt to be exhaustive or inclusive in the making or integrating of decisions" (Fredrickson & Mitchell, 1984: 399).

likely to slow the pace of decision making. Janis (1982) indicated that, although a rational process may be superior, it also lengthens decision making.

A second view has emphasized that limited participation and centralized power speed decision making. For example, Vroom and Yetton (1973) advocated autocratic decision making when speed is essential. Powerful leaders can make rapid, unilateral choices. Similarly, March and Olsen (1976) argued that involvement by many decision makers lengthens the decision process. Finally, Staw, Sandelands, and Dutton (1981) indicated that power centralization is the most natural response to highly uncertain situations like high-velocity environments.

A third view is that limited conflict speeds decisions. The argument here is that conflict triggers interruptions in the decision process, which then slow the pace. For example, Mintzberg, Raisinghani, and Theoret (1976) found that disagreements created decision interruptions, which in turn delayed the decision process in a study of 25 major decisions. Similarly, another study (Hickson et al., 1986) found that opposition, especially by powerful factions, slowed the pace of decision in a study of British organizations.

Although these views vary in detail, none deals with two key realities. First, how do decision makers overcome anxiety and gain the confidence to decide? As George (1980) noted, many individuals find it difficult to make big decisions in the face of high uncertainty. Yet such uncertainty is typical of strategic decisions, especially in high-velocity environments. So how do decision makers overcome their natural proclivity to procrastinate, especially when information is limited? Second, how do decision makers maintain decision quality while moving quickly? The existing views rest on the assumption that fast decisions are achieved through a less thorough strategic decision-making process involving limited information, analysis, participation, and conflict. However, as Bourgeois and Eisenhardt (1988) noted, there is pressure for both a rapid and high-quality decision process, especially in high-velocity environments. Is the snap decision process described by existing views realistic?

These questions suggest that extant views may inaccurately describe how executives make rapid decisions. This observation, coupled with the limited research base on fast strategic decision making, led to the inductive research described in this paper.

METHODS

The study used a multiple case design that allowed a replication logic, that is, a series of cases is treated as a series of experiments, each case serving to confirm or disconfirm the inferences drawn from the others (Yin, 1984). Table 1 describes the eight microcomputer firms studied.

The study also employed an embedded design, that is, multiple levels of analysis, focusing on each firm at three levels: (1) top management team, (2)

TABLE 1
Descriptions of Microcomputer Firms

Firm	Number of Employees	Number of Informants
Zap	500	7
Forefront	90	7
Promise	185	6
Triumph	150	7
Omicron	192	9
Neutron	200	7
Alpha	50	5
Presidential	462	5

strategic decision, and (3) firm performance. Although an embedded design is complex, it permits induction of rich and reliable models (Yin, 1984).

Data Sources

Members of the research group conducted interviews with every member of the top management team of each firm, including CEOs and their immediate subordinates. The teams typically included the CEO and the heads of such major functions as sales, finance, and engineering.

There were four data sources: (1) initial CEO interviews, (2) semistructured interviews with each member of a firm's top management team, (3) questionnaires completed by each member of the team, and (4) secondary sources.

CEO interviews. An entry interview, using a semistructured format, was conducted with the CEO of each firm. The interview began by asking the CEO to describe the firm's competitive strategy. The CEO was then asked to describe the distinctive competencies of the firm, major competitors, and their performance. Each CEO then identified several recent or ongoing major decisions. The decision or decisions to study in depth in subsequent interviews with each member of the top management team were then chosen. The choices were based on criteria similar to those other researchers have used for defining strategic decisions (Hickson et al., 1986; Mintzberg et al., 1976).² To be chosen, a decision had to (1) involve strategic positioning, (2) have high stakes, (3) involve as many of the functions of the firm as possible, and

² Ideally, many strategic decisions would have been studied in each firm. However, doing so was almost impossible because strategic decisions are infrequent events. The approach here was to triangulate insights from one or two decisions with evidence on the overall approach to strategic decision making within the firm. The validity of this approach is enhanced by previous research indicating that firms make decisions in a consistent pattern (Fredrickson & Iaquinto, 1987; Miles & Snow, 1978; Nystrom & Starbuck, 1984), even when the top management team experiences turnover in individual positions (Weick, 1979).

(4) be considered representative of the process by which major decisions are made at the firm.³

Top manager interviews. After the initial CEO interview, semistructured interviews with every executive in the top management team, including the CEO, were conducted. The interview consisted of 16 open-ended questions. Following the methods of inductive research, these questions were supplemented with ones that seemed fruitful to pursue during the interview. The interviews were typically from 90 minutes to two hours long but occasionally took as long as four hours.

The interview began with a request for a description of the firm's competitive strategy. Each executive then described the functional strategy of his or her area, other members of the top management team, the frequency and nature of interaction with each other member of the team, and routine decision-making meetings. Thus, a general view of the strategic decision process within the firm emerged.

In the second portion of the interview, the story of each strategic decision identified in the CEO entry interview was traced. This yielded a view of specific decision processes within the firm. The perspective of every member of the top management team was traced using standard interview questions. The questions concentrated on facts and events, rather than on respondents' interpretations, through the use of courtroom procedure (e.g., When did this first become an issue? What did you do? When?).

Two investigators conducted each interview with one responsible for the interview and the other for taking notes. Immediately after the interview, the investigators cross-checked facts and impressions. Several rules were followed. The "24-hour rule" required that detailed interview notes and impressions be completed within one day of the interview. A second rule was to include all data, regardless of their apparent importance at the time of the interview. A third rule was to end the interview notes with ongoing impressions of each company.

The combination of multiple informants, courtroom-style questioning, and tandem interviewing addresses some previous criticisms of research relying on executives' recollections (Schwenk, 1985). Moreover, previous research (Huber, 1985; Mintzberg et al., 1976) has indicated high temporal stability in executives' recollection of important decisions, especially for major recent decisions.

Questionnaires. Quantitative data were gathered from questionnaires. The questions focused on variables, such as conflict and power, suggested by prior research on decision making (e.g., Mintzberg et al., 1976; Pfeffer, 1981). The Appendix describes the questions and their administration.

Secondary source and other data. Industry reports and internal docu-

³ One decision was studied in depth at every firm except Omicron and Triumph. In those two firms, two decisions fit the selection criteria; both were subsequently studied to provide more solid empirical grounding for the propositions.

ments were examined as available. Informal observations were made, and data were collected on office locations, team demographics, and financial performance before and after the study. Finally, observations of a day-long strategy-making session in one firm and a weekly executive staff meeting in another were conducted.

Data Analysis

The data were analyzed as follows. For the quantitative data, team level scores of conflict and power were calculated and analyzed for patterns. The qualitative responses were combined using profiles of the decision climates and of each executive from the descriptions each member of the top management teams had given. Traits mentioned by more than one executive were included in the profiles. For example, three of his four colleagues described the president of Alpha as "impatient."⁴ This trait was included in his profile, but other traits mentioned by only one person were dropped.

Decision stories were developed by combining the accounts of each executive into a time line that included all events. There was typically high agreement among respondents around the critical issues of when a decision began, when the decision was made, and how it was made. Again using Alpha as an example, the executives all agreed that the impetus for the decision studied was a specific board meeting, that the CEO made the decision alone, and that he did so just before the annual planning conference. Although they were few, conflicting reports were preserved in the stories. These usually concerned one person's assumptions about another's motives or opinions, not observable actions and events.

Once preliminary analyses had been developed from the respective data sets, I combined the analyses and induced propositions using methods for building theory from case studies (Eisenhardt, 1989; Glaser & Strauss, 1967). The search for propositions was assisted by selecting pairs of firms and listing similarities and differences between each pair and by categorizing firms according to variables of interest, such as the presence or absence of a counselor to the CEO. From these lists and comparisons, I induced tentative propositions. After the development of these tentative propositions, each case was revisited to see if the data confirmed the proposed relationship, and if they did, to use the cases to improve understanding of the underlying dynamics. After many iterations between data and propositions, I used existing literature to sharpen the insights yielded by the inductive process. What emerged were propositions linking information, alternatives, advice, conflict resolution, and integration with decision speed and performance. As in deductive research, the propositions fit the evidence but did not perfectly explain the cases (Sutton & Callahan, 1987).

⁴ The names used to identify the firms studied are pseudonyms.

HOW ARE FAST STRATEGIC DECISIONS MADE?

Speed, Planning, and Real-Time Information

Prior research has suggested that comprehensiveness slows the strategic decision-making process (Fredrickson & Mitchell, 1984). Consideration of few alternatives, obtaining inputs from few sources of expertise, and limited analysis shorten the strategic decision process (Janis, 1982; Mintzberg et al., 1976; Nutt, 1976). This perspective implies that the greater the use of information, the slower the strategic decision process.

The data from this research indicate a different view. Executive teams making fast decisions used extensive information—often more information than the slower decision makers used. However, that information was not forecasted information. Rather, it was *real-time information*, especially on a firm's competitive environment and operations. Real-time information is defined as information about a firm's operations or environment for which there is little or no time lag between occurrence and reporting. In formal terms,

Proposition 1: The greater the use of real-time information, the greater the speed of the strategic decision process.

Table 2 summarizes this study's evidence on the speed of decision making. I assessed the overall speed of decision making from interview and story data. These qualitative assessments were corroborated with measurement of the duration of each strategic decision studied. Following prior research (Hickson et al., 1986; Mintzberg et al., 1976), I measured duration using the beginning and end times for each decision, with starting time indicated by the first reference to a deliberate action such as scheduling a meeting or seeking information and ending time indicated by the time at which a commitment to act was made.

As Table 2 indicates, there was high variation in the speed of decision making. The first four firms listed—Zap, Forefront, Promise, and Triumph—made the decisions that were studied in less than 4 months, and substantial evidence from the interviews and stories corroborated that such a fast pace was typical. For example, most Promise executives mentioned without prompting that they made decisions “quickly,” and their making a decision on strategic direction in 4 months is consistent with the data. Throughout this article, those four firms are referred to as fast. The second four firms—Omicron, Neutron, Alpha, and Presidential—spent at least 6 months, and typically more than 12 months, making the decisions that were studied, and the qualitative evidence (see Table 2) corroborated that this slower pace was typical. Thus, I refer to those firms as slow.

Table 3 summarizes the evidence for the use of real-time information, which was assessed by (1) executive responses to interview questions regarding the regular review of performance measures and targets, (2) a count of the number of meetings regularly scheduled to review current operations,

TABLE 2
Speed of Strategic Decision Making

Firm	Examples*	Decisions and Key Questions	Decision Durations in Months
Zap	"We try to be the first." (VP, engineering) "If we get bogged down, he [CEO] kicks ass." (VP, marketing) "The worst decision is no decision at all." (CEO)	Alliance: Should we form a strategic alliance or go public?	3
Forefront	"We're aggressive. We make things happen." (director of marketing) "Big opportunities go by if you don't act quickly." (VP, sales)	New product: Should we develop a new product?	2
Promise	"I like quick decisions." (CEO) "We make decisions fast." (VP, systems development)	Strategy: Do we need a new strategic direction?	4
Triumph	"Decision making at Triumph is much faster." (VP, finance) "He [CEO] listens, makes up his mind, and does it. He's made the decision process shorter." (VP, sales) "Do something, don't just sit around worrying." (CEO)	Strategy: Do we need a new strategic direction? New product: What should our next product be?	1.5 1.5
Omicron	"Slow moving." (VP, manufacturing) "There was a frustrating amount of decorum. Consensus was very important." (VP, sales) "We did what we intended, but took longer than we should have." (CEO)	Strategy: Do we need a new strategic direction? Strategy: What should our new strategy be?	12 6
Neutron	"We were late." (VP, finance)	Alliance: Should we form a strategic alliance?	12
Alpha	"We never did anything concentrated . . . no particular dedicated time . . . things kind of evolved." (VP, sales) "We were kind of casting around." (VP, finance)	New product: Should we develop an IBM-compatible product?	12

TABLE 2 (continued)

Firm	Examples ^a	Decisions and Key Questions	Decision Durations in Months
Presidential	<p>"Presidential was unfocused. We weren't concentrated." (EVP)</p> <p>"Lots of arguments—no decisions." (VP, manufacturing)</p> <p>"There was no structure . . . nothing got accomplished." (VP, R&D)</p> <p>"Nothing happened . . . It was so hard to get ideas through." (EVP)</p>	New product: Should we develop a new product?	18

^a VP = vice president; EVP = executive vice president.

(3) the presence of a vice president (VP) of finance—typically the key provider of real-time information in firms like those studied—and (4) the orientation of a firm's CEO toward information. Executives' preferences for various communication media and the use of real-time information in the making of the strategic decisions studied in each firm were also noted.

The data shown in Tables 2 and 3 indicate that fast strategic decision making is associated with extensive use of real-time information. Executives making fast decisions routinely paid close attention to quantitative indicators such as daily and weekly tracking of bookings, scrap, inventory, cash flow, engineering milestones, and competitors' moves. They preferred these operational indicators to more refined accounting data such as profit. These executives averaged 2.5 regularly scheduled operations meetings per week and indicated a preference for real-time communication via face-to-face conversation or electronic mail rather than through time-delayed media like memos.

The Zap case illustrates the linkage between the use of real-time information and decision speed. Zap executives claimed to "measure everything." Without prompting, the CEO described exact targets for gross margin and expenses for R&D, sales, and administration. Executives reviewed bookings daily. Engineering schedules were reviewed weekly. The VP of finance ran a computer model of firm operations weekly. The VP of marketing monitored the environment continuously. As she told us, "I keep an eye on the market [and] funnel the information back." The R&D VP told us that he monitored the technology "grapevine" through his extensive network of friends. Monthly, the executive team reviewed a wide range of quantitative indicators, including revenue per employee, margins, backlog, scrap, cash, and inventory. This is a much more comprehensive set of indicators than the teams making the slower decisions used. Zap's CEO told us:

TABLE 3
Real-Time Information

Firm	Vice President for Finance?	Routine Quantitative Targets and Measures	Number of Weekly Operations Meetings	CEO's Information Orientation	Examples
Zap	Yes	Cash Bookings Scrap Inventory Margins Revenue/employee Plus others	3	"Numbers guy"	"We have very strong controls. We over M.B.A. it . . . We measure everything." (CEO)
Forefront	Yes	Bookings Backlog Billings Receivables Customer service Plus others	2	"Short-term focused"	"Any company that is faced with long development can't know how things will evolve. You can only monitor the outside world and direct the evolving strategy at what you see." (VP, finance)
Promise	Yes	Cash Bookings Inventory Cost Plus others	2	"Numbers guy" "Very action-oriented" "Pragmatic"	"We have the constant pulse of how the company is doing." (VP, finance)

TABLE 3 (continued)

Firm	Vice President for Finance?	Routine Quantitative Targets and Measures	Number of Weekly Operations Meetings	CEO's Information Orientation		Examples
Triumph	Yes	Cash Bookings Engineering milestones Sales Quality assurance Plus others None mentioned	3	"Quantitative" "Focused"		"I keep lists for everything." (CEO)
Omicron	Yes, but an engineer who was "weak" on finance	None mentioned	2	"Visionary" "Detached"		"Our business plan calls for certain business levels, but nothing specific. . . . My own [targets] are subjective." (CEO)
Neutron	Yes	None mentioned	1	"Visionary"		"My role is to critique from a detached point of view. . . . I protect funds and assets for the board and investors." (VP, finance)
Alpha	Yes	Sales Profit	1	"Always racing"		"We were not getting a lot of information." (VP, manufacturing)
Presidential	No	Sales Profit Gross margin	0	"Visionary" "Detached"		"Management by rambling conversation." (VP, manufacturing)

"We have very strong controls. We over M.B.A. it." Zap executives also reported interacting continually through face-to-face communication and electronic mail. They avoided memos. For example, one executive described her communication with the CEO and several other VPs as "constant." Finally, the decision to forge a strategic alliance that was studied was triggered by the team's cash projection model, which predicted an upcoming cash shortfall. Zap executives made this decision in three months. A Zap executive claimed: "The worst decision is no decision at all."

The Triumph case also indicates the link between use of real-time information and rapid strategic decisions. For example, the first employee hired by the current CEO was a data-base manager whose job was to track new product development projects, the lifeblood of microcomputer firms. Firm members described the CEO as "quantitative," and he claimed to "have lists for everything." Interviewees described the weekly staff meetings at Triumph as "a must." One executive said, "No one travels on Mondays." My own visit revealed that the Monday meetings were intense. The day began with a four-hour meeting that "[covered] what's happening this week—what's happening with sales, engineering schedules, and releases." In the afternoon, Triumph executives attended quality assurance and new-product progress meetings. The executives also conducted regular "round table" forums at which lower-level employees gave feedback to senior executives. Triumph executives made the decision on whether to redirect their strategy in six weeks and also made a major product decision in six weeks. One executive advised: "Do something, don't just worry about decisions."

In contrast, there was little mention of real-time information from the teams making the slower decisions. What was mentioned suggested that such information was not particularly germane to their decision processes. For example, the Omicron CEO was asked to describe any quantified targets that he used to track performance. He answered that he did not use quantified targets, saying "My own goals are subjective . . . Integrity is key for me." The VP of finance was an engineer, described as weak in financial matters. Omicron executives pondered whether to change their strategic direction for a year and then spent six more months deciding what their new strategic direction would be. The VP of manufacturing summarized: "We're slow-moving."

The evidence on real-time information use for the other teams making slow decisions is consistent with that at Omicron. For example, Alpha had no weekly operations meetings until several VPs insisted that they were necessary. Presidential had neither weekly operations meetings nor a VP of finance. Firm members described the CEO of Presidential as a "visionary" and as "a little detached from day-to-day operations," and described his key VP as "unfocused." At Neutron, no one mentioned real-time data, although there were stories of largesse such as trips to Hawaii for star design engineers and of the top management team's lack of interest in conserving cash. In these firms, the descriptions indicated that decision making was typically

slow, and the durations of the strategic decision processes studied averaged 14 months, compared with 2.8 months at the fast firms.

Why does the use of real-time information quicken the pace of the strategic decision process? One reason may be that such information speeds issue identification, allowing executives to spot problems and opportunities sooner (Dutton & Jackson, 1988). For example, the rationale for the round table forums with lower-level staff at Triumph was "to avoid sudden, surprising, and bad information."

A second reason is more subtle. The literature on artificial intelligence indicates that intuition relies on patterns developed through continual exposure to actual situations (Hayes, 1981; Simon, 1987). If so, executives who attend to real-time information are actually developing their intuition. Aided by intuition, they can react quickly and accurately to changing stimuli in their firm or its environment. Although the data are limited, the CEOs who relied most heavily on real-time information were also most frequently described as being intuitive. For example, the CEO at Zap was known as a "numbers" person and claimed to "over-M.B.A. it," yet he was also the CEO most strongly described as "intuitive," as "a lateral thinker," and as having "the best sense of everything in business"—despite his being the least experienced CEO in the study.

Finally, constant attention to real-time information may allow executive teams to gain experience in responding as a group. The frequent review of real-time information may develop the social routines people need to respond rapidly when pressing situations arise.

Why do the present results fail to support the view that information slows strategic decision making (Fredrickson & Mitchell, 1984; George, 1980; Nutt, 1976)? One reason is that this view does not distinguish planning information from real-time information on competitive environments and firm performance. However, executives do make that distinction. The CEO at Promise said: "I'm a numbers guy, but I'm not heavy on analysis." Zap executives used computer models but called them "pretty elementary." On the other hand, several teams making slow decisions fit the image of information-users as bureaucratic planners (Quinn, 1980). For example, Omicron executives spent about six months developing a forecast of technical trends. Thus, it appears that real-time information, which gives executives intimate knowledge of their business, may speed decision making, but planning information, which attempts to predict the future, does not.

Speed, Timing, and Number of Alternatives

Fredrickson and Mitchell described a comprehensive decision-making process as one that includes being "exhaustive in the generation and evaluation of alternatives" (1984: 402). However, as they and others (Janis, 1982; Vroom & Yetton, 1973) have noted, multiple alternatives are likely to slow the strategic decision process.

In contrast, the data here suggest that faster decision making was asso-

ciated with more, not fewer, alternatives. Moreover, the sequencing of alternatives was crucial to the pace. Rapid decisions were characterized by simultaneous consideration of multiple alternatives, and the slower decisions were characterized by sequential consideration of fewer alternatives. In formal terms,

Proposition 2: The greater the number of alternatives considered simultaneously, the greater the speed of the strategic decision process.

The overall propensity of a team to use multiple simultaneous alternatives was assessed from the interview and story data. The number of alternatives was quantitatively measured in each decision by recording each unique alternative mentioned by every respondent. I also determined the timing of initiation and discarding of alternatives. Simultaneous alternatives were options that executives considered during at least partially overlapping time periods. Sequential alternatives were considered at times that did not overlap.

As Table 4 indicates, the data suggest that considering multiple simultaneous alternatives was associated with fast decisions. For example, Zap executives typically generated "multiple scenarios." The alliance decision, in which Zap executives considered bank loans, going public, and additional venture capital, in addition to the strategic alliance option, corroborates that finding. Within the strategic alliance option, Zap executives also negotiated simultaneously with several potential alliance partners.

Another example is the decision on strategic redirection at Triumph. The decision makers maintained multiple options, including sale of the firm's proprietary technology, liquidation, a new strategic direction, and tactical changes in the existing strategy, during the decision-making process. Moreover, firm informants described Harry, the CEO of Triumph, as typically retaining multiple options. One executive said, "Harry can live with a lot of ambiguity, a wide range of options . . . Harry likes to have a larger set of options than most people do. He can carry many in his head at once. He thinks it's better if you can work a multiple array of possibilities instead of just a couple."

Several Promise executives claimed that team members usually generated multiple alternatives. One VP described the tactics as follows: (1) proposing a sincere alternative, (2) supporting someone else's alternative even when actually opposing it, and (3) proposing an insincere alternative, one that the proposer did not actually support. The purpose of these tactics was to "aerate" different options.

In contrast, the slower teams usually considered few alternatives and searched for a new alternative only when an old one was no longer feasible. For example, the Alpha top management team considered only one new product option for almost a year. During that time, the CEO worked alone. When the CEO finally made a formal presentation of his alternative, the entire team opposed it. Only then did Alpha executives consider a second alternative. Similarly, the Neutron team moved to an alliance only when

TABLE 4
Alternatives

Firm	Decision	Number of Alternatives	Alternatives	Timing
Zap	Alliance	4	Alliance Public offering Bank loans Venture capital	Simultaneous
Forefront	New product	3	New product Extension of existing product Status quo	Simultaneous
Promise	Strategy	3	Status quo Major strategic shift into new markets and products Minor strategic shift to capitalize on sales opportunities	Simultaneous
Triumph	Strategy	4	Refine current strategy Sell firm's technology Liquidate firm	Simultaneous
	New product	2	Major strategic shift Low-end product Moderate to high-end product	Simultaneous
Omicron	Strategy	2	Major strategic shift Better management of sales and manufacturing	Simultaneous
	Strategy	2	Major strategic shift in distribution Major strategic shift in product and market	Simultaneous
Neutron	Alliance	2	In-house development Alliance	Sequential
Alpha	New product	2	IBM-compatible product Interface product	Sequential
Presidential	New product	2	VLSI ^a product with U.S. partner Licensed product with Japanese partner	Sequential

^a VLSI = very large scale integrated circuit.

in-house product development plans were so delayed as to require an external product source.

Why do the results fail to support the view that consideration of multiple alternatives is time-consuming (Fredrickson & Mitchell, 1984; Lindblom, 1959)? One reason is that alternatives are difficult to assess in isolation. For example, it is difficult to buy a car without looking at several cars.

As studies of dialectical inquiry and multiple options have indicated (e.g., Anderson, 1983; Schweiger et al., 1986; Schwenk, 1983), the reason is that the process of comparing alternatives helps decision makers to ascertain the alternatives' strengths and weaknesses and builds decision makers' confidence that the most viable alternatives have been considered. As one Promise executive stated, "This [considering multiple alternatives] forces us into hypothesis-testing mode."

Second, having simultaneous alternatives reduces the escalation of commitment to any one option (Staw, 1981). Decision makers who pursue multiple options have a lower psychological stake in any one alternative and thus can quickly shift between options if they receive negative information on any alternative. Thus, decision makers who pursue multiple options are less likely to become psychologically trapped and can quickly act on negative information.

Third, simultaneous alternatives provide a fallback position. If one alternative fails, executives can quickly shift to a new one. For example, Zap executives simultaneously pursued negotiation with multiple possible strategic alliance partners, going public, and obtaining bank loans and venture capital. When the "first-choice" alliance partner left the negotiations, the president quickly cut a deal with the second choice. If that deal had failed, the firm had a backup line of credit and was poised to go public. The entire decision process was consummated in three months. In contrast, sequential consideration of alternatives provides no such ready fallback positions. For example, Presidential executives explored one product option for nine months. When that option collapsed, the team had nothing to fall back on, and the decision was delayed another five months while the team searched for a new option.

Finally, the view that multiple alternatives are time-consuming does not distinguish between the number of alternatives considered and the depth of analysis. The slow teams spent a great deal of time—but often on only one alternative. For example, Alpha and Presidential executives spent nine months working on single alternatives. In contrast, the fast teams pursued several alternatives, analyzed quickly. According to laboratory studies (e.g., Payne, Bettman, & Johnson, 1988), such a breadth-not-depth decision-making strategy is highly efficient in situations in which time pressure is high.

Speed, Power, and the Role of the Counselor

In addition to the cognitive factors discussed above, political factors may also influence the pace of decisions (Mintzberg et al., 1976; Vroom & Yetton, 1973). For example, Hickson and his colleagues (1986) found that resistance by influential people was a leading cause of delay in making strategic decisions in a sample of British organizations. Alternatively, when few executives are involved, a decision process can be rapid. For example, Vroom and Yetton (1973) advocated autocratic decision making in situations

in which speed is essential. From that perspective, centralized power should quicken decision making.

In contrast, the data indicated no pattern linking decision speed to either qualitative or quantitative indicators of power centralization. Some autocrats were fast, but others were slow.⁵ However, the process whereby CEOs gathered advice was important. The teams making faster decisions had a two-tier advice process. Their CEOs sought counsel from all members of the top management team, but they focused on obtaining advice from one or two of the firm's most experienced executives, whom I termed "counselors." In contrast, the CEOs whose teams made slow decisions either had no counselor or had a less experienced executive in the counselor role. In formal terms,

Proposition 3: The greater the use of experienced counselors, the greater the speed of the strategic decision process.

Table 5 summarizes the data on counselors. An executive was designated a counselor when (1) team executives explicitly identified the individual as a counselor, adviser, or confidante to the CEO, (2) the description of the interaction between the CEO and the focal executive indicated a company-wide, rather than a functional, range of topics, and (3) there was story evidence of the CEO's seeking the counsel of the focal executive in the strategic decision studied. Table 5 also delineates each counselor in terms of age, experience, and personality descriptions provided by other executives.

Every team making rapid strategic decisions had at least one experienced counselor. For example, the CEO at Forefront described the VP of sales as his "confidante." He described their interaction as "more general than just sales," adding "When I talk with Joe it's often about company issues." In the decision studied, this VP triggered the decision by alerting the CEO to a major competitor's entry into the market. He then advised the CEO regarding competitive responses and served as a sounding board for the CEO's ideas.

Frequently, the oldest and most experienced executives filled the counselor role. For example, the counselors at Zap were 10 to 20 years older than most other team members. One counselor, the sales VP, had worked in the microcomputer industry since its inception and had top-level experience at two prominent firms. The other, the VP of engineering, had worked for 15 years at a major computer firm, where he had been a senior general manager. Zap's CEO said: "I seek the advice of Bob [sales], the most knowledgeable about the market, and Jim [engineering], the best manager." Often, counselors were well known to the CEO. For example, at Forefront, Promise, and Triumph, the CEO and counselor had previously worked together. Finally, the counselors frequently were on a career plateau, with their aspirations cen-

⁵ Quantitative measures are explained in the Appendix; data are available from the author.

TABLE 5
Characteristics of Counselors

Firm ^a	Counselors	Evidence ^b	Examples	Age	Description	Experience
Zap	VP, sales	I, S	"I talk a lot with the strongest managers—Bob who knows the outside world, and Jim, who is the best manager." (CEO)	55	"Experienced" "Solid guy"	20 years in the industry. Key sales executive for two prominent firms.
	VP, engineering	I, S		46	"Outstanding" "Savvy"	15 years in the industry. Senior general manager at a top firm.
Forefront	VP, sales	I, S	"My confidante. . . . When I talk with Joe, it's often about company issues." (CEO)	48	"Extremely street savvy" "Senior guy"	Sales executive in the industry for 15 years. Worked for CEO previously.
Promise	VP, marketing	I	"I talk with Jim about a broader range of issues." (CEO)	39	"Intelligent" "Farthinking"	Co-founder with 12 years in the industry. Worked for CEO previously.
Triumph	Consultant	I, S2	"I offer advice and help and work with Harry on whatever he thinks is important." (consultant)	55	"Renaissance man" "Very experienced" "First-class manager"	Past CEO of two companies. Sits on several boards. Worked with CEO previously.
Omicron	VP, corporate development	I, S1, S2	"I come up with ideas and Jon reacts." (CEO)	33	"High level of contacts" "Hates to manage" "Quiet"	Co-founder. Old friend of CEO. Nonmanager.
	VP, strategic planning	I, S1, S2	"I bounce ideas off Ken." (CEO)	32	"Bright" "Young, bright" "Loyal"	First line manufacturing manager.

^a There was no counselor at Alpha, Presidential, or Neutron.

^b I = Strong support from interviews, based on evidence from multiple individuals. S = Strong support from stories, based on evidence from multiple individuals. 1 = the first decision studied in a firm and 2 = the second decision.

tering on personal interest. As the VP for sales at Forefront claimed, "I'm not in it for the money. It's fun to build an organization again."

Triumph is a particularly telling illustration. When the CEO joined the firm, no one on the existing team fit the profile of an older, experienced executive. What did the CEO do? He hired a consultant, whom he had known for about 15 years, to fill the counselor role. The 55-year-old consultant had been a CEO, had extensive industry contacts, and had served on several boards. His colleagues described him as "very experienced" and "a first-class manager." Firm informants credited the individual with playing a critical role in developing alternatives in the new product decision that was studied and with being a sounding board for several executives besides the CEO.

In contrast, the slow teams either did not have counselors (Alpha, Neutron, and Presidential) or had less experienced executives filling the role (Omicron). For example, one counselor at Omicron was the VP of strategic planning. At 32, he was the youngest executive on the team. His colleagues described him as "bright," but "young." The other counselor, VP for corporate development, was described as "afraid of managing."

Why does an experienced counselor speed decision making? One reason is that the counselor hastens the development of alternatives, providing a quick sounding board for ideas. Also, since counselors are often long-time associates of a CEO and are people whose career aspirations have been met, they are likely to be particularly trustworthy, enabling executives to be very open. Finally, experienced counselors are likely to provide very useful advice.

Second, an experienced counselor can help a team deal with the ambiguity of high-stakes decision making in fast-paced environments. As George noted, "In the face of uncertainty embedded in complex issues executives often find it difficult to act" (1980: 37). An experienced confidante can help overcome such barriers by sharing the decision-making effort and relating the decision to past experience. Confidence in a choice is likely to improve when the issues have been discussed with an experienced confidante.

Overall, the results fail to support the view that centralized power accelerates the pace of decision making (Vroom & Yetton, 1973). One reason is that this view neglects the effects of procrastination. People delay because of anxiety, inadequate information, and lack of time. These barriers to decision afflict autocrats as much as collegial executives. In fact, power centralization may exacerbate such barriers by isolating a CEO and creating an information-restrictive political culture (Eisenhardt & Bourgeois, 1988). For example, Alpha's autocratic CEO characteristically worked alone on the new product decision. Since he worked without help, was burdened with his other duties, and was functioning in the context of a highly political team (Eisenhardt & Bourgeois, 1988), the decision process dragged on for a year. Thus, power centralization may give a CEO the authority to decide but does not overcome the formidable information and psychological barriers to decision.

Speed, Conflict, and Resolution

Several authors (Hickson et al., 1986; Mintzberg et al., 1976) have argued that conflict influences the length of a decision process. For example, Mintzberg and his colleagues found that conflict created interruptions in the process. Therefore, from this perspective, increasing conflict slows the pace of strategic decisions.

The data indicated no pattern linking decision speed to either the general level of conflict within a team or conflict on the decision studied.⁶ However, conflict resolution was crucial. The fast teams actively dealt with conflict, with decision makers resolving it on their own. In contrast, conflict resolution was problematic for the teams making slow decisions. They tended to delay until external events forced a choice. In formal terms,

Proposition 4: The greater the use of active conflict resolution, the greater the speed of the strategic decision process.

Table 6 summarizes the teams' approaches to conflict resolution. I assessed conflict resolution from interview responses indicating each team's usual approach and story data indicating the specific approach taken in the decision studied. Close attention was paid to whether the process was an active one in which decision makers resolved the conflict on their own or a passive one in which decision makers delayed the resolution of conflict until deadlines approached, opponents of an alternative left the team, or external events eliminated competing alternatives.

Every team making fast decisions took an active approach to conflict. In fact, all the fast teams used the same process, termed "consensus with qualification" by a Promise VP. Consensus with qualification is a two-step process. First, a team attempts to reach consensus by involving everyone. If agreement occurs, the choice is made. However, if consensus is not forthcoming, the CEO and, often, the relevant VP make the choice, guided by input from the entire team. Zap's VP for engineering described the process as follows: "Most of the time we reach consensus, but if not, Randy [the CEO] makes the choice."

Forefront's new product decision illustrates consensus with qualification. The decision generated significant disagreement. Several executives argued that a new product would divert engineering resources from a more innovative one currently in design. Others argued that a new product was necessary to counter the moves of an important competitor. Still others argued that a simple extension of an existing product was the appropriate choice. The team held a series of meetings, and the final decision was made at one such meeting. One VP described the decision as a push for consensus, followed by the CEO's decision. Not all the VPs agreed with the choice. However, as the CEO told us: "The functional heads do the talking . . . I pull the trigger."

⁶ Quantitative measures are in the Appendix; data are available from the author.

TABLE 6
Conflict Resolution^a

Firm	Active	Passive		Examples
	Consensus with Qualification	Deadlines	Consensus	
Zap	I, S			"It's very open. . . . We're successful most of the time in building consensus. Otherwise Randy [CEO] makes the choice." (VP, engineering)
Forefront	I, S			"The functional heads do the talking . . . then I pull the trigger." (CEO)
Promise	I, S			"Quick decisions involving as many people as possible." (CEO)
Triumph	I, S2			"Harry [CEO] just said something like 'this is what I've heard and it makes sense.' "
				" 'We will do. . . . ' Harry sensed when everyone had said enough and all the points were out." (consultant)
Omicron		S2	I,S1	"Snap decisions where consensus is appropriate and vice versa." (VP, finance)
Neutron		S		
Alpha		S		"Don [CEO] will bring up topics over and over till decisions go his way." (VP, manufacturing)
Presidential			I,S	"We found that operating by consensus essentially gave everyone veto power. . . . Nothing got accomplished." (VP, R&D)

^aI = Strong support from interviews, based on evidence from multiple individuals. S = Strong support from stories, based on evidence from multiple individuals. 1 = the first decision studied in a firm and 2 = the second decision.

In contrast, conflict resolution was problematic in the slow teams. Sometimes, the teams waited for consensus. That behavior was typical at Presidential, where the executives agreed that "we did everything by consensus." Not surprisingly then, Presidential executives sought consensus on the new product decision that was studied. For a year, debate dragged on

over whether they should develop the product with a U.S. partner. A decision was finally reached when several VPs who opposed that proposal left the firm, and that option was the only one still available.

Sometimes, the slow teams waited for deadlines. For example, a deadline—the annual meeting—triggered the Alpha decision. With the meeting less than a month away, the top management team rejected the CEO's first alternative of developing an IBM-compatible product. Team members believed that such a product would stretch R&D and sales resources too thin. Frustrated by this rejection and facing an impending deadline, the CEO came up with a new alternative. Without consultation, he made the choice himself. As he stated, "I said 'to hell with it' and shoved it down their throats."

Omicron executives oscillated between consensus and snap decisions in the face of deadlines. For example, in the first Omicron decision, the team waited for about a year for consensus to emerge. It did emerge only after the VP of marketing, the main opponent of the decision that was finally made, left the firm. The second Omicron decision was triggered by a deadline. The board of directors pressured the team to articulate a strategic direction. The CEO stopped consensus-style meetings, and then met alone with several VPs. Soon after this, he chose a strategic direction on his own. As he described: "One night, I went home after Andy [VP for strategic planning] had been really high on his idea. I slept on it and canned it. I pursued my idea." The CEO's choice was a recent idea that he had never discussed within the firm. One VP claimed: "[We] make snap decisions where developing consensus over time is appropriate and vice versa."

Why is consensus with qualification rapid? One reason is that it copes actively with the conflict common to strategic decisions. It does not involve waiting for outside events, such as executives leaving or deadlines arriving, to trigger decision. Second, it is popular with executives. Most executives want to be involved, but are not anxious to make choices, except in their own areas. For example, one VP at Zap claimed: "I'm happy just to bring it [her views on the alliance] up." This satisfaction limits time-consuming political activity (Eisenhardt & Bourgeois, 1988).

In contrast, other approaches to conflict resolution are often slow. Consensus takes time to develop and may never be achieved since many strategic decisions involve executives who hold honest differences of opinion. Although on occasion a team may reach consensus rapidly, more frequently consensual conflict resolution results in the situation described by a Presidential executive: "We found that operating by consensus essentially gave everyone veto power. There was no structure. No product would ever get out that way. Nothing got accomplished." In fact, many executives dislike the consensual approach. Typical were the comments of an Omicron VP: "I wanted Bill [the CEO] to dictate and not to waste time in meetings to bring consensus. I had more pressing problems to worry about." Waiting for deadlines is also slow because many strategic decisions do not have them. Deadlines, if they occur at all, may arise only after a long period of time, and so many strategic decisions can be postponed indefinitely.

The results have similarities with extant literature. As Gersick's (1988) work would predict, the slow teams accelerated their decision processes in the face of deadlines. However, they did not shift to the process used by fast decision-making teams. Rather, they shifted to the noncomprehensive decision process many authors have described (e.g., Fredrickson & Mitchell, 1984; Lindblom, 1959). For example, the CEO at Alpha made a snap decision to develop an interface product that no one had seriously analyzed. Similarly, the CEO at Omicron chose a strategy that involved major shifts in engineering and marketing but never discussed it within the firm. In those cases, the executives speeded up the process by making snap choices. Although others have described such a noncomprehensive process as fast (Fredrickson & Mitchell, 1984), the evidence here suggests that the approach was embedded in a slow decision process. Thus, noncomprehensive describes the way that slow teams accelerate.

Speed, Fragments, and Decision Integration

The final critical difference between teams making fast and slow strategic decisions lies in the web of relationships among those decisions. The evidence indicates that fast teams attempted to integrate strategic decisions with one another and with tactical plans. In contrast, the teams making slower decisions treated decisions as discrete and even disconnected events. In formal terms,

Proposition 5: The greater the integration among decisions, the greater the speed of the strategic decision process.

Decision integration was assessed using qualitative evidence for teams' usual approaches to decision integration and stories of the specific decisions. Decisions were examined in relation to their integration with past and current strategic decisions and tactical plans like budgets and engineering schedules.

The teams making fast decisions more completely integrated those decisions with other major decisions and with tactical plans. For example, Triumph executives claimed that when they made a major decision, they also developed plans to manage the worst case outcome. One VP termed this practice "knowing your way out of each decision." During the time of the strategic redirection decision studied, the team members integrated their choice of strategy with a new product decision, tactical plans for execution, and a worst-case plan to sell firm technology.

The decision began with the arrival of a new CEO. According to firm executives, the CEO spent about two weeks conferring with people throughout the firm. Gradually, he shifted the team's attention to articulation of alternative paths for the firm, including the sale of technology, liquidation, a new strategic direction, and tactical changes to the existing strategy. In the process of developing and choosing among these alternatives, the executives also decided the specifications for a new product, scheduled the timing of three new product releases, and rebudgeted the entire firm for the coming

year. At the end of six weeks, a new strategic direction was set, a new product choice was made, and tactical plans in the form of detailed budgets and engineering schedules were complete.

Similarly, the Zap alliance decision was integrated with other decisions. Although Zap executives chose an alliance to solve their short-term cash problems, they simultaneously addressed future cash needs by planning an initial public offering. The executives made tactical plans for each functional area and set milestones whose arrival would trigger the public offering. Thus, after three months, Zap executives emerged with a plan that coordinated the short-term decision to form an alliance with the long-term decision to make a public offering, tactical plans to execute a public offering, and contingency plans to obtain backup bank credit.

In contrast, the slow teams made decisions in fragments, with little concern for how decisions related to each other or to tactical plans. For example, Presidential executives struggled for over a year deciding whether to develop a new product. Only after the product decision was made did they consider how to integrate the product into their existing product lines. Presidential executives were still trying to decide after a year of deliberation. As one executive said, "We don't have a strategy of what to do with the [product] yet." Because of the delay, the new product still had not produced revenue.

Similarly, Omicron executives reported that they enjoyed thinking about strategic decisions in the abstract, "on a blank sheet of paper." Their approach to the strategic redirection decisions corroborates this view. Omicron executives spent about a year deciding whether to change strategy without any serious consideration of what the new strategy should be. Having made the decision to switch, they then spent another six months choosing the new strategic direction. Specific product choices still had to be made, and as this research concluded, tactical plans, such as changes in engineering priorities and budgets, had not been made. It is striking that, as described above, Triumph executives made a similar decision—and chose a new product, scheduled three product releases, and rebudgeted the firm—in six weeks, compared to the eighteen months spent at Omicron on the initial decision.

Why is greater decision integration associated with faster decision making? One reason is that decision integration helps executives to analyze the viability of an alternative more quickly. Second, it helps them to cope with the ambiguity of high-stakes decision making. As the literature on active coping suggests (Gal & Lazarus, 1975), development of concrete ties with other major decisions and decision details may alleviate the anxiety that can plague executives as they face high-stakes decisions. The process of developing specific plans may give executives a better understanding of alternatives and provide feelings of competence and control (Langer, 1975). These in turn produce the confidence to act. Also, such integration may limit discontinuities between decisions. In contrast, lack of decision integration keeps decision making at an abstract level, where anxiety can loom large.

The data, especially those from the slow teams, support this interpretation. For example, one Omicron executive said, "We don't have the confidence to know how to do it [set strategic direction]." Another summarized the prevailing view: "Maybe we saw too much mystery. Maybe we needed more gut. You don't know any more even though you wait."

Why do the results fail to support previous views of decision integration as slow (Fredrickson & Mitchell, 1984; Quinn, 1980)? One reason is that prior research has neglected the effects of concrete planning on actively coping with uncertainty. Second, the prior views were predicated on the idea that executives achieve integration through complex formal planning systems. For example, Quinn noted: "The planning activity often tended to become a bureaucratized, rigid, and costly paper-shuffling exercise" (1980: 2). However, the fast decision teams did not integrate decisions using complex systems involving a wide range of integration techniques, consultation with outsiders, or large expenses (Fredrickson & Mitchell, 1984). Rather, they maintained mental maps of how decisions fit together and supplemented those maps with brief plans and action-oriented, operational documents such as budgets and engineering schedules. For example, Promise executives summarized their strategic direction with a three-page statement. Overall, the fast decision-making teams simultaneously kept in mind multiple decisions. In contrast, the slow teams were linear thinkers, treating each decision as a discrete event.

HOW DOES STRATEGIC DECISION SPEED LINK TO PERFORMANCE?

The second research question was: How does the speed of strategic decision relate to performance? Firm performance was assessed by (1) CEOs' numerical self-reports of company effectiveness (0 to 10 scale), (2) a comparison of that rating to ratings CEOs gave to competitors, and (3) sales growth and profitability figures before and after the study. At the decision level, I assessed performance by whether team executives supported a decision after the fact, made similar decisions later, and implemented the decision. Table 7 summarizes these data.

The data support the proposition that faster decision making is associated with better performance. Admittedly, the evidence is tenuous, because performance can depend upon many factors, including those described in earlier studies (Bourgeois & Eisenhardt, 1988; Eisenhardt & Bourgeois, 1988). Also, fast decision making using a different style than shown in these cases might lead to different results. For example, snap decision making by an impulsive CEO might lead to fatal errors. However, the proposition is presented because the performance differences were substantial and the data strongly suggested underlying dynamics that support the relationship. In formal terms,

Proposition 6: The greater the speed of the strategic decision process, the greater the performance in high-velocity environments.

TABLE 7
Performance

Firm	Decision Performance	1984 Sales ^a	1984		Examples	1985 Performance ^c
			1983-84 Sales Trend	After-Tax Return on Sales ^b		
Zap	"I'm happy with the decision." (VP, sales)	50,000	Up	8%	"Right on the money." (VP, sales)	Strong: 50 percent sales increase, initial public offering.
Forefront	"So far, I like what I see." (VP, sales)	30,000	Up	9	"We are right on plan." (President)	Strong: Initial public offering.
Promise	"Yes, I'm happy with the decision. Our strategy is now better articulated." (VP, software)	1,000	Up	-1,280	"Struggling to be great." (VP, finance)	Promising: 500 percent sales increase, losses trimmed.
Triumph	"Sure, I'm happy with the decision. It worked well." (VP, finance)	10,000	Up	-33	"The slope is in the right direction. We have a shot at being a remarkable company." (CEO)	Promising: 50 percent sales increase, break-even profits, initial public offering announced.
Omicron	"I wish it had been done in half the time. Sooner." (VP, corporate development). "Time is passing by." (VP, human relations)	30,000	Flat	-9	"It's put up or shut up time." (VP, human relations)	Turnaround: New CEO hired, 50 percent sales increase, profitability up to 5.9 percent.
Neutron	"We were late." (VP, finance)	30,000	Flat	-31	"Puberty has been rough." (VP, marketing)	Dead: Chapter 11.
Alpha	"The decision was used as a means of group focus." (VP, manufacturing)	10,000	Down	-1	"Disappointing." (VP, operations)	Mixed: Sales dropped 1 percent, profitability up to 3.5 percent.
Presidential	"The only problem was that the decision took too long to make." (EVP)	50,000	Flat	-20	"We didn't bring the technology to market as we should have. (EVP)	Down: Sales dropped 30 percent, continued to lose money.

^a The sales figures are $\times \$1,000$ and rounded to preserve anonymity.

^b After-tax profits \div sales.

^c This is post-study performance.

For example, Zap's performance has been spectacular, with sales growing at 25 to 100 percent per quarter. Zap executives considered the alliance decision to have been successful and have since executed other similar decisions. Forefront's executives also positively evaluated their decision. One stated: "So far, I like what I see." Another said: "The verdict so far is favorable." Forefront has been a strong performer, with sales tripling and after-tax profits running at 9 percent during the year after the study. Similarly, the Triumph and Promise executives assessed their decisions positively. For example, one VP at Promise said, "Yes, I'm happy with the decision. Our strategy is now better articulated." Another at Triumph said, "Sure, I'm happy with the decision. It worked well." At the time of the study, both firms were struggling. Promise was an early venture just getting started, and Triumph had recently replaced its CEO. Since the study, sales at Promise have soared 500 percent, and Triumph has become one of only two survivors in its niche and has announced plans to go public.

By contrast, slow decision making was associated with poor performance. For example, Presidential executives viewed their new product decision as good, but too slow. As one VP told us: "The only problem was that it took too long to make the decision." Another said: "Our products were too late and they were too expensive." As the firm fell behind its competitors, sales tumbled 30 percent in the year after this study, and the firm continued to lose money. The delay at Neutron proved costly as well. The market opportunity was missed, and the firm went bankrupt a year after the study. At Alpha, the executives expressed relief that the CEO's original alternative was shelved. However, the firm continued to drift, with stagnant sales and profits.

Omicron is an interesting case because there was a performance turnaround. During this study, the firm experienced flat sales and mounting losses. Omicron executives attributed much of the problem to the slow decision making of the CEO. As one VP said: "Bill's procrastination caused the problem." But Bill was replaced and, although the data are limited, the new CEO appeared to change the decision process. One VP reported: "Jim [the new CEO] has a different style, he pays more attention to the numbers." Another claimed: "He is not caught in analysis paralysis." Jim was also described by the same adjectives that were used to describe the CEOs of the fast decision teams—"decisive," "operations-focused," "hands-on," and "instinctive." He described others as either fast, indicating approval, or slow, indicating disapproval. Although Jim made several changes that seemed to improve firm performance (Eisenhardt & Bourgeois, 1988), the team agreed that he was "accelerating the decision process." Consistent with the proposition linking decision speed and performance, Omicron attained a 50 percent sales increase and became profitable during Jim's first year as CEO.

Why is slow decision making problematic? One reason may be learning. Executives learn by making decisions, but if they make few decisions, as slow decision makers do, they learn very little. So they are likely to make

mistakes. A second reason is that, in fast-paced environments, opportunities move quickly, and once a firm is behind, it is difficult to catch up. The qualitative data were particularly supportive of this point. For example, a Presidential VP said: "We tried to use consensus, but it gave everybody veto power and we ended up doing a random walk. Our products were too late and they were too expensive." Presidential still has not caught its competitors. Neutron executives echoed this view. For example, the VP of finance observed: "The big players [customers and distributors] were already corralled by the competition. We were late." The firm never regained its early momentum and went bankrupt.

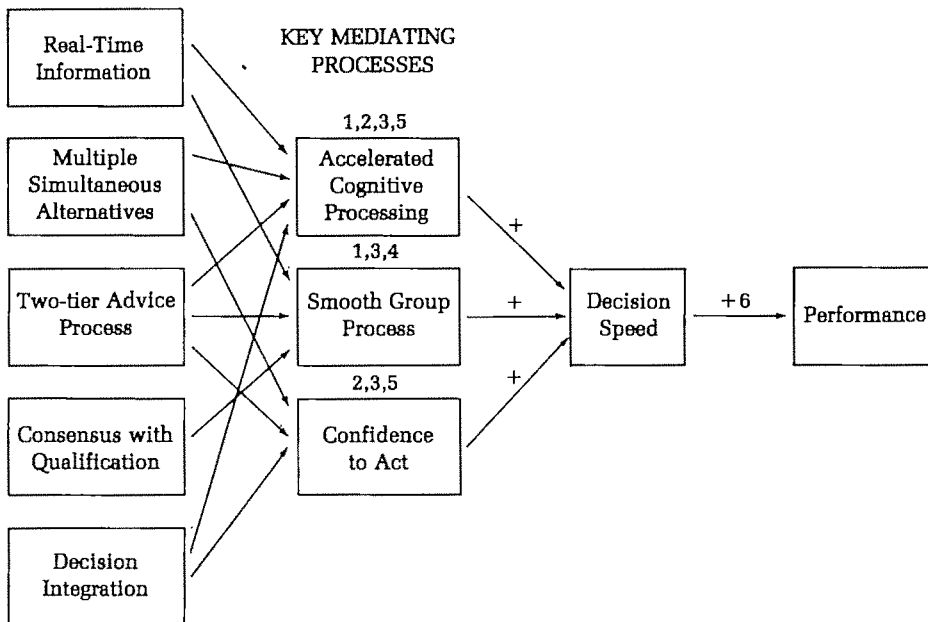
In contrast, the strong performers reiterated the importance of keeping pace with the environment. A Promise VP said: "You have to keep up with the train." Zap executives claimed: "If you don't innovate, someone else will." Their CEO argued that the best management training was playing video games, to hone fast decision-making skills. The sales VP at Forefront said: "You've got to catch the big opportunities." An executive at Triumph advised: "Do something, don't just sit around worrying about decisions." This quote may summarize such ideas best: "No advantage is long-term because our industry isn't static. The only competitive advantage is in moving quickly" (VP of finance, Promise).

TOWARD A MODEL OF THE SPEED OF STRATEGIC DECISION MAKING

This research explored the speed of strategic decision making in a high-velocity environment. Such environments are particularly challenging because information is poor, mistakes are costly, and recovery from missed opportunities is difficult. The findings are a set of propositions, depicted in Figure 1. They are organized around three mediating processes.

Several of the propositions focus on how executives making fast decisions accelerate their cognitive processing. For example, these executives immerse themselves in real-time information on their environment and firm operations (Proposition 1). The result is a deep personal knowledge of the enterprise that allows them to access and interpret information rapidly when major decisions arise. In contrast, the slow executives have a less firm grasp on their business. So, when strategic decisions occur, they grope about, try to plan, and have trouble focusing on key information. The executives making fast decisions also use tactics to accelerate analysis of information and alternatives during the decision process. For example, they examine several alternatives simultaneously (Proposition 2). The comparison process speeds their analysis of the strengths and weaknesses of the options. They also gather advice from everyone but focus their attention on the most experienced executives, who are likely to have the most useful advice (Proposition 3). Finally, they integrate key decisions and tactical planning within the decision process (Proposition 5). Doing so quickens executives' assessment of the viability of alternatives. Overall, the executives making fast decisions

FIGURE 1
A Model of Strategic Decision Speed in High-Velocity Environments^a



^aNumbers correspond to propositions in the text.

accelerate their cognitive processing by using efficient problem-solving strategies that maximize information and analysis within time constraints (Hayes, 1981; Payne et al., 1988). These strategies are neither comprehensive nor noncomprehensive, but rather a mix of both.

Second, several of the propositions describe how executives making fast strategic decisions create a smooth group process. For example, constant perusal of real-time information allows executives to rehearse their performance routines with one another (Proposition 1). The result is a team conditioned to work together successfully in turbulent situations. Similarly, although the consensus-with-qualification approach emphasizes the roles of executives in their own areas, it also rests on participation by the entire team (Proposition 4). The data suggest that executives favor this approach. They want a voice but do not necessarily want to make choices, except in their own arenas. Finally, the fast teams use a two-tier advice process (Proposition 3). This advice process emphasizes the role of counselors, but all are consulted and can participate if they choose. In sum, the fast decision makers create a smooth group process through rehearsal and participation. In particular, these behaviors yield fast decisions because they combine participation and decisiveness in a way that is popular with executives.

Several propositions also converge on the importance of confidence in high-stakes decision making. Anxiety can cripple decision makers in such situations (George, 1980). The teams making fast decisions engage in behaviors to cope with this anxiety and build confidence. One tactic is to rely on the counsel of experienced executives, who impart confidence and a sense of stability (Proposition 3). A second tactic is to seek multiple alternatives (Proposition 2). Doing so gives decision makers the confidence that they have surveyed most of the likely options, leaving "no stone unturned." Most important, the fast executives tie together strategic decisions and concrete operating plans (Proposition 5). This attention to day-to-day detail and linkage across major decisions gives a sense of mastery and control that imparts the confidence to act and creates a structure within which action is possible (Gal & Lazarus, 1975; Langer, 1975).

Finally, the findings corroborate an earlier study by Bourgeois and Eisenhardt (1988) linking fast decision making with effective performance (Proposition 6). The findings suggest a configuration of cognitive, political, and emotional processes that is associated with rapid closure on major decisions.

This article began by describing the extant views of fast strategic decision making: that is, strategic decision making is fast when it is more centralized, less comprehensive, and less conflictual. The results fail to support these views. Rather, the findings here suggest that comprehensiveness is not a single construct. Consistent with laboratory studies of decision making under time pressure (Payne et al., 1988), the results suggest that fast decision makers try to be efficient in their use of time. So, they are comprehensive in some ways, but not in others. For example, they seek advice from the best sources but not from everyone, and they develop multiple alternatives but analyze them quickly in comparison. "Noncomprehensive" better describes how slow teams accelerate. The results also differ from the view (Hickson et al., 1986; Mintzberg et al., 1976) that conflict is an important determinant of pace. One reason may be that those authors focused on situations where conflict slowed the pace but not on equally conflictual situations in which conflict was resolved. Thus, they could not observe the essential role of conflict resolution in determining decision speed (Gersick, 1989; Tjosvold, 1985). Finally the centralization view (e.g., Vroom & Yetton, 1973) neglects that autocrats become bogged down by inadequate information, excessive workloads, and anxiety as much as, and perhaps more than, others do.

CONCLUSIONS EMERGING FROM A RESEARCH PROGRAM

This work is part of a larger research program on strategic decision making in high-velocity environments. The initial article (Bourgeois & Eisenhardt, 1988) identified some attributes of successful decision making in this setting. A subsequent article on politics explored one of those attributes: the relationship between a decisive CEO and a powerful executive team (Eisenhardt & Bourgeois, 1988). The present article explores a second

attribute: fast strategic decision making. The results link fast decisions to several factors, including the use of real-time information, multiple alternatives, counselors, consensus with qualification, and decision integration.

From this research program, a perspective is beginning to take shape that challenges some traditional thinking about strategic decision making. This emergent view places crucial importance on *top management teams*. Others (Hickson et al., 1986; Mintzberg et al., 1976) have argued that decision characteristics are paramount. The view here is that, although decision characteristics are important, there are recurring interaction patterns among executives that also profoundly influence strategic decision making and, ultimately, firm performance.

Second, this view emphasizes a *complex perspective on cognition*. A rational versus incremental paradigm has dominated the literature on strategic decision making, with the rational model often cast as a straw man (Anderson, 1983; Cyert & March, 1963; Lindblom, 1959; Quinn, 1980). The results of this research program suggest the limitations of that dichotomy. People are boundedly rational but are also capable of engaging in sensible problem-solving strategies to help compensate for their limitations. In this view, interesting research questions center on problem solving strategies, and results from the artificial intelligence literature may be particularly relevant.

Finally, the emergent perspective highlights emotion as integral to high-stakes decision making. The politics article (Eisenhardt & Bourgeois, 1988) indicated that intense emotions such as frustration, distrust, and loyalty shaped organizational politics. Similarly, the present article identifies confidence and anxiety as key factors influencing the pace of decision closure. Thus, the view emerging from this research program is that emotion is critical for understanding strategic decision making.

The current article and the overall research program address the process of strategic decision making, especially in fast-paced, technology-driven environments. The microcomputer industry is admittedly an extreme situation, a setting that places an extraordinary premium on fast, high-quality decision making. However, if the ideas presented here survive empirical tests, they offer lessons for all organizations as they face an increasingly turbulent world.

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APPENDIX

Quantitative Measures

Goal conflict (Bourgeois, 1980). The goal question consisted of a list of ten organizational goals, introduced by: "In the space provided, indicate how important each of these goals is to your firm" (0–10 scale). The goals included: long-term profitability, growth, innovation, stock price, company prestige, and community service. Each top management team's standard deviation on each of the goal items was summed.

Policy conflict (Bourgeois, 1980). The questionnaire contained a matrix in which 12 key decision areas ran down one side of the paper and executive titles ran across the top. The text read: "Here is a list of various decision areas which may be of strategic importance to your firm. Please indicate how important each of these decision areas is to the long run health of your firm" (0 = not at all important, 10 = extremely important). Decision areas were: marketing strategies and product pricing, R&D project selection, expansion of production capacity, major financings, and restructuring the organization. The team standard deviation on each of the items was summed.

Interpersonal disagreement (Astley, 1978). Conflict was also measured in terms of interpersonal disagreement. In order to obtain interpersonal disagreement scores for each top management team, each executive was asked to evaluate the frequency of disagreement with each

other specific member of the team. The text read: "How often during the process of deliberating, debating, and making policy decisions, have you found yourself in open disagreement with the suggestions or proposals of each of these individuals?" (0 = never, 10 = constantly). The mean score for each executive and then the overall mean for the team were computed.

Power (Astley, 1978). Using the same key-decision-area matrix described above, we asked executives to assign scores to each manager on each decision in terms of how much influence that manager had on the decision (0 = no influence, 10 = very great deal of influence). The text read: "Now, for the same list of decision areas (excepting those scored 0 or 1), indicate how much influence you think each manager has in making decisions concerning that decision area. If the manager has a very great deal of influence over the decision area, give a rating of 10; no influence would score 0; and so on." Computing mean scores every other respondent assigned to an executive involved three steps: a mean power score for each person on each decision; a mean score for each decision area (R&D, marketing, finance, manufacturing, and organization); and an overall mean.

Kathleen M. Eisenhardt received her Ph.D. degree in organizational behavior from Stanford University. She is an assistant professor in the Department of Industrial Engineering and Engineering Management, School of Engineering, at Stanford University. Her research interests include strategic decision making and entrepreneurship in high-technology environments, agency theory, and inductive methods.

THE AFTERMATH OF ORGANIZATIONAL DECLINE: A LONGITUDINAL STUDY OF THE STRATEGIC AND MANAGERIAL CHARACTERISTICS OF DECLINING FIRMS

RICHARD A. D'AVENI
Dartmouth College

This study looks at the strategic and managerial consequences of organizational decline. Comparisons were made among 49 firms filing for bankruptcy and between those firms and a matched sample of nondeclining, surviving firms for the five years prior to the bankruptcy filings. Four findings emerged: The existence of different patterns of decline was confirmed. Those patterns were related to the timing of the consequences of decline. The consequences of decline included managerial imbalances, actions concerned with efficiency, centralization effects, and strategic paralysis, all reflecting threat-rigidity responses. Finally, despite the adverse effects of organizational decline, bankruptcy may be delayed or even avoided in an environment of growing demand.

Many authors have studied the consequences of decline (e.g., Cameron, Whetten, & Kim, 1987; Whetten, 1980). However, few have explicitly discussed longitudinal patterns and rates of decline that may influence the timing of those consequences. Drawing on a series of interviews and a small number of case studies, Argenti (1976) was perhaps the first to report that firms decline at different rates. He also reported three patterns of decline that precede bankruptcy and discovered that some bankrupt firms do not fail immediately after they decline. Some delay the onset of bankruptcy for years.

To date, Argenti's findings await confirmation and further explanation. Moreover, most studies of the consequences of decline have been theoretical summaries (Staw, Sandelands, & Dutton, 1981; Whetten, 1980) or case-

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oriented reports (Argenti, 1976). Only Miller and Friesen (1977), Cameron, Whetten, and Kim (1987), and Cameron, Kim, and Whetten (1987) have published large-scale empirical studies that look at the dysfunctional attributes of postdecline organizations. Miller and Friesen did not specifically focus on postdecline problems, and Cameron and his colleagues limited their studies to nonprofit organizations.

As a means of extending knowledge about the consequences of decline, this study examined three related research questions. First, what are the managerial and strategic consequences of decline? Second, do patterns of decline affect the timing of those consequences? That is, do the consequences of decline develop just before bankruptcy, several years before bankruptcy, or both? Third, what characteristics delay the onset of bankruptcy after a firm declines? In other words, what factors affect the timing of bankruptcy? Beyond asking these questions, the purpose of this study was to extend and confirm Argenti's work by using a more generalizable, larger sample of for-profit firms than he employed and a more reproducible methodology, based on quantitative measures.

LONGITUDINAL PATTERNS OF DECLINE AND THE ONSET OF DECLINE

Consistent with Cameron, Sutton, and Whetten's (1988) usage, in this article "decline" refers to decreasing internal resource munificence over time. Declining organizations are declining with respect to two critical resources: financial and human (managerial) resources. Indicators of declining financial resources include decreases in liquidity, profitability, and borrowing capacity due to increasing leverage (Altman, 1968). Indicators of declining managerial resources include decreasing numbers of prestigious top managers who add to the human capital of a firm. The educational achievement (Becker, 1975) and other status characteristics of a firm's top managers enhance its human capital (D'Aveni, 1987, 1989).

Internal financial resources are important because they provide funds for investment and slack cash to cover short-run cash crises. Managerial resources are important because managerial prestige is a resource that provides legitimacy in the eyes of external stakeholders. That legitimacy in turn assures that a firm has access to needed resources provided by exchange partners (D'Aveni, 1989).

This definition of decline distinguishes between decline and downsizing organizational operations. Downsizing involves changes in organizational size and scope, such as limiting sales, selling off fixed assets or subsidiaries, and pruning product-market domains. Although many declining organizations also downsize their operations, downsizing and decline do not always occur simultaneously or at the same rate.

Few studies other than Argenti (1976) have explicitly discussed patterns of decline, but several previous studies have implicitly suggested the pos-

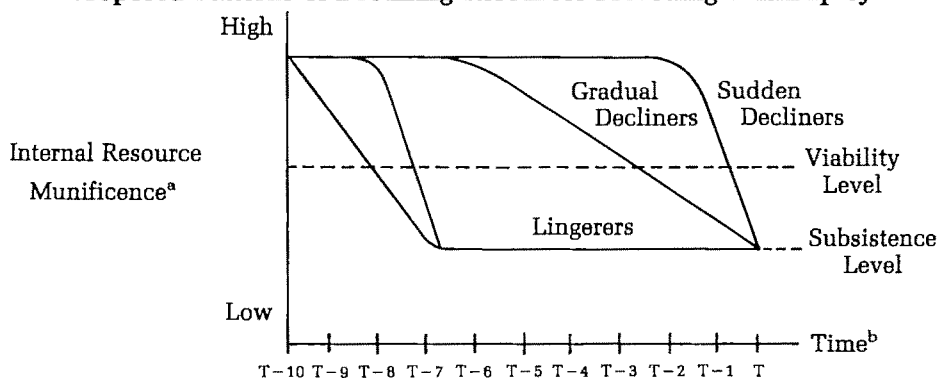
sibility of differences in firms' rates of decline and in the length of time to the onset of failure once decline is completed. Thus, some patterns that precede bankruptcy can be inferred from those studies. Figure 1 illustrates three such patterns: sudden decline, gradual decline, and lingering.

Sudden decline is characterized by the rapid collapse of a firm, followed by sudden bankruptcy. Richards (1973) and Argenti (1976) found that some firms declined rapidly after taking on the higher risks associated with a very costly series of frequent or major acquisitions and plant expansions. Miller and Friesen (1977) also found a common failure syndrome characteristic of what they called impulsive firms. These were relatively small or competitively disadvantaged firms that undertook bold or frequent strategic reorientations. Such reorientations financially overextend firms because they are costly and disruptive (Tushman & Romanelli, 1985).

Gradual decline is characterized by the slow, incremental decline of a firm, followed by a bankruptcy filing immediately after the decline is complete. Miller and Friesen (1977) found two types of firms that gradually withered away: stagnant bureaucracies and headless firms. Both declined gradually because their inflexibility or aimlessness caused them to become increasingly insensitive to their external environments. They failed to adapt by undertaking too few strategic reorientations, which in turn incrementally increased their misfit with their environment (Tushman & Romanelli, 1985). These firms are similar to Argenti's (1976) type 2 failures.

Lingering is exemplified by firms that decline, either rapidly or gradually, but then delay bankruptcy for several years. They exist in a postdecline state of inadequate financial and managerial resources. Argenti (1976) found several firms that lingered in a postdecline state and labeled them type 3 failures. These firms used downsizing activities as a means of temporary survival, sometimes delaying bankruptcy for several years. Although the literature on gradual and sudden decline has stressed the causes of decline,

FIGURE 1
Proposed Patterns of Declining Resources Preceding Bankruptcy



^a The index of internal resource munificence reflected both financial and managerial resources.

^b T = year of bankruptcy; T-1 = the year preceding bankruptcy, and so forth.

work on postdecline firms has emphasized the managerial and strategic problems caused by decline itself. This literature is discussed in more detail below.

THE CONSEQUENCES OF DECLINE AND THEIR TIMING

Whether organizational decline is quick or slow, once it is finished, postdecline firms evidence strategic behaviors that are not observed among healthy firms (Whetten, 1980). For example, by the time decline is complete, firms are often in a state of strategic paralysis (Whetten, 1980). Cameron, Whetten, and Kim (1987) found evidence, albeit weak, that postdecline colleges had high levels of resistance to change and low levels of innovative activities.

Such behavior may be the consequence of severe postdecline resource scarcity. Resource scarcity alone does not, however, explain the paralysis of postdecline firms, because some troubled firms use downsizing activities to generate cash to fund turnaround activities (Hambrick & Schechter, 1983). The aftermath of organizational decline leaves firms with many dysfunctional managerial attributes, other than resource scarcity, that can cripple their ability to act effectively (Whetten, 1980). Thus, the consequences of decline may contribute to postdecline firms' inability to initiate or implement a successful turnaround.

Strategic and Managerial Characteristics of Postdecline Firms Not Found in Healthy Firms

Postdecline firms are distinguishable from firms that have not declined because the former are paralyzed strategically. For the reasons discussed below in this section, postdecline firms also engage in downsizing and centralization, and they have inadequately staffed top management teams that contribute to their paralysis.

Hypothesis 1: Postdecline firms display strategic and managerial characteristics not found in healthy firms.

More specifically, compared to similarly sized, successful firms in the same environment,

Hypothesis 1a: Postdecline firms show strategic paralysis by taking less domain initiative: they enter fewer new lines of business and make fewer mergers and acquisitions.

Hypothesis 1b: Postdecline firms downsize their operations, exiting more lines of business and liquidating or divesting more subunits to generate cash.

Hypothesis 1c: Postdecline firms have a larger percentage of their top management teams reporting directly to their

chief executives, indicating centralization through tighter supervision of the decision making process.

Hypothesis 1d: Postdecline firms show managerial imbalances through the presence of a higher percentage of people with legal, financial, or accounting backgrounds on their top management teams.

Hypothesis 1e: Postdecline firms also show managerial imbalances through having a lower percentage of people with marketing, R&D, and production and operations backgrounds on their top management teams.

Those differences result because decreasing internal resources may, among other things, generate a threat-rigidity response among the managers of declining firms (Staw et al., 1981). The elements of such a response include restricting some types of information processing, emphasizing efficiency, and increasing centralization of the decision-making process. Some of the expected actions concerned with efficiency are the use of downsizing measures, such as divesting subunits and liquidating fixed assets to generate cash and to cut excess capacity. A typical centralization action is increased supervision of the decision-making process by a central authority like the chief executive officer (CEO). An increasing span of CEO control, or increase in the percentage of top managers reporting directly to the CEO, would evidence centralization.

Despite the wealth of theory suggesting that centralization is part of a threat-rigidity response, two recent studies found no evidence of centralization in response to threats in a laboratory setting (Gladstein & Reilly, 1985) or in response to declining revenues among universities (Cameron, Kim, & Whetten, 1987; Cameron, Whetten, & Kim, 1987). Conversely, D'Aunno and Sutton (1988) found that drug abuse treatment centers centralized in response to financial threats.

These efficiency and centralization responses, if they occur, tend to lessen a firm's overhead costs in the short run. However, the net effect of such responses is that, under threat, many firms do not adapt. Actions taken to achieve centralization and efficiency do not resolve a firm's underlying strategic problems. Efficiency actions do not create strategic turnarounds (Hambrick & Schechter, 1983) because they do not affect a firm's domain or move it to a more favorable domain. In addition, centralization actions may inhibit effective adaptation because bureaucracies become more rigid as a result of attempts to improve productivity through increased supervision (Masuch, 1985; Meyer, 1985).

Another reason for lack of adaptation is that, under threat, top-management teams become focused on short-run goals, to the exclusion of long-term planning and needed strategic change (Hall & Mansfield, 1971; Smart & Vertinsky, 1977). Thus, postdecline firms fail to make strategic

changes and ignore the need for significant domain initiatives, such as entering new lines of business or acquiring new subunits.

As postdecline firms face serious cash crises and new creditor demands, the composition of their top-management teams may become unbalanced for two reasons related to threat-rigidity response. First, an efficiency orientation may lead firms to cut back discretionary expenditures and managers in critical functions such as marketing, R&D, and throughput. (Throughput refers to production activities, or to operations in nonmanufacturing firms.) Second, cash-starved postdecline firms may create top-management teams that are unbalanced, with an overemphasis on serving their creditors' demands. As Pfeffer and Salancik (1978), among others, have suggested, firms gather managerial resources to cope with their critical resource dependencies. Thus, postdecline firms seek the managers best trained to deal with creditors and short-term cash goals and are likely to hire people with finance, accounting, and legal backgrounds whose underlying disciplines are based on monitoring and controlling discretionary expenses, debt covenants, contractual agreements, and the cost of capital.

Unfortunately, managers from these backgrounds may lack the marketing training needed to adapt to competitive trends (Hayes & Abernathy, 1983). They are also likely to lack the level of knowledge about technological matters, production methods, and other organizational throughput systems that managers who have spent most of their careers in operations will have accumulated. This lack of knowledge may inhibit both operating and strategic turnarounds by making it impossible for a firm's managers to initiate truly effective changes in its efficiency or in its product-market domains (Hayes & Abernathy, 1983).

Admittedly, the relationships just sketched are oversimplifications. Functional backgrounds do not totally constrain people's choices because people can develop new strategic repertoires by gathering information from others with different backgrounds. However, even though the debate is still ongoing (Walsh, 1988), several researchers (Aguilar, 1967; Dearborn & Simon, 1958; Hambrick & Mason, 1984; Kefalas & Schoderbek, 1973) have argued that functional backgrounds influence information-processing abilities, strategic preferences, knowledge about strategic options, environmental scanning, and other aspects of strategic decision-making processes.

Patterns of Decline and Differences in the Timing of the Consequences of Decline

When do the consequences of decline (Hypotheses 1a to 1e) first show themselves? That is, does the aftermath of decline first occur just before firms go bankrupt or several years before?

Hypothesis 2: Failing firms that evidence different patterns of decline will evidence consequences of decline at different times relative to their bankruptcy date.

If firms follow different patterns of decline, the timing of the consequences of decline should differ. Gradual and sudden decliners do not com-

plete their decline until just before they go bankrupt. On the other hand, lingerers complete their decline several years before they fail and remain in a postdecline state until they fail.

Hypothesis 2a: Gradual decliners will not show the consequences of decline that postdecline lingerers do several years before bankruptcy.

Hypothesis 2b: Gradual decliners will show the same consequences of decline that postdecline lingerers do just before going bankrupt.

Similar hypotheses can be drawn for firms that decline suddenly.

Lingerers and gradual decliners should be different several years before they fail because the former have declined and the latter have not. However, just before bankruptcy, both types of firms have finished their declines, and thus both should show evidence of decline at that time.

Hypothesis 3: Certain factors explain the delay in the onset of bankruptcy once decline is complete.

There is a second way to look at the timing of the consequences of decline. Instead of looking at when a firm has completed its decline, a researcher can look at when the bankruptcy occurs by asking what factors allow some firms to delay bankruptcy. An answer to this question may explain why the consequences of decline may be evident for long postdecline periods among lingerers and for just a short postdecline moment among sudden and gradual decliners. In other words, the question addresses the factors that allow some firms to linger.

For the reasons discussed after the following subhypotheses, I propose that postdecline lingerers are distinguishable from firms that decline but do not linger because the lingerers are in more favorable environments or have size-related attributes that contribute to their (perhaps temporary) survival. That is, compared to firms that fail immediately after they decline,

Hypothesis 3a: Postdecline lingerers are in industries with higher growth in the rate of demand, and they go bankrupt later if that growth rate becomes negative.

Hypothesis 3b: Postdecline lingerers are in industries with more demand uncertainty.

Hypothesis 3c: Postdecline lingerers have more fixed assets that can be liquidated.

Hypothesis 3d: Postdecline lingerers have a higher amount of long-term debt, encouraging creditor commitment.

Staw and his colleagues (1981) pointed out that the consequences of a threat-rigidity response are not always dysfunctional. Efficiency responses, for example, may save a firm if they generate enough cash to keep a firm going until environmental conditions have improved enough to help it survive (Zammuto & Cameron, 1985). An improving environment, one in which demand is growing, may delay the failure of some weak firms in postorga-

nizational decline because, as demand grows, competitive pressures are lessened and industry shakeouts are avoided (Porter, 1980). Although a buoyant environment may save some postdecline firms from bankruptcy, this reprieve may be only temporary. When and if the environment becomes hostile (demand declines), the lingering period will end, and the firms are likely to fail. Only adaptive, strategically well-positioned firms will survive a demand decline (Harrigan, 1980).

Other environmental factors may make it possible for postdecline firms to linger. Uncertainty with respect to the rate of demand growth, for example, may encourage creditors to allow a troubled debtor firm to linger. If next year's demand growth is unpredictable, it is impossible to be sure about the firm's fate, perhaps encouraging creditors to hold a false hope of recovery. This belief may in turn delay a bankruptcy because the creditors may hope for a miracle, especially if they are averse to recognizing big losses (Kahneman & Tversky, 1979).

Some postdecline firms may also be able to delay bankruptcy for size-related reasons. There is considerable evidence, at the individual level of analysis, that investors prolong the life of some firms because of escalating commitment (e.g., Staw, 1976; Staw & Fox, 1977). The literature on commitment suggests that firms owing significant sums of money ensnare creditors because lenders delay the recognition of significant losses.

Some large postdecline firms may be able to forestall bankruptcy because they are capable of staving off their creditors' demands for cash with their great ability to downsize their operations. Postdecline firms with large amounts of fixed assets can generate cash through prebankruptcy liquidation. Others may generate cash by exiting low-margin lines of business and liquidating subunits (Hypothesis 1b). Some of Argenti's (1976) type 3 failures survived only as long as they could continue a prebankruptcy disbanding of organizational assets. Similarly, Miller and Friesen found a failure syndrome, which they called "swimming upstream" (1977: 268), that involved seriously troubled firms using downsizing to survive.

Finally, some firms delay bankruptcy permanently by turning around. The issue of how to reverse the effects of decline is, however, outside the scope of this study. Instead, Hypothesis 3 looks at the less frequently discussed question of why unreversed decline does not always cause bankruptcy, at least in the short run.

METHODS

A matched-pairs design was used for this study. The sample was composed of 49 large bankrupt firms and 49 survivors matched by environment and size. For each pair, data were collected for the five years preceding the bankruptcy. This type of design allowed me to classify the bankrupt firms according to their longitudinal pattern of decline over their last five years of existence. Then I was able to compare the postdecline lingerers to their matched survivors as a means of assessing the consequences of decline. I

was also able to compare the postdecline lingerers to gradual decliners at various points in time.

Sample Design

The sample was selected in three steps. First, a random sample of bankrupts was selected from a population of large bankruptcies. Second, I excluded "intentional" bankruptcies and firms with insufficient data. Third, the bankrupts were matched by the process described below.

The bankrupt firms. Firms were randomly selected from among the 1,000 approximately largest (by sales size) bankruptcies that occurred between 1972 and 1982 in the manufacturing, retail, and transportation sectors of the U.S. economy. I identified this population of bankruptcies from Chapter X and XI filings mentioned in published reports of stock exchange delistings, unpublished data used by Dun and Bradstreet for its bankruptcy survey, records of the Securities and Exchange Commission, Altman's (1983) research, and articles indexed in the *Funk and Scott Index of Corporate Change*.

The population was limited to large bankruptcies because small failing firms must be treated as a separate class of failures outside the scope of this study. Small firms do not decline because they may never reach a sufficiently high level of resources from which to decline (Argenti, 1976).

In order to facilitate the data analysis, I excluded bankrupt firms that had not been listed in the *Dun and Bradstreet Directory of Corporate Management*, a major data source for this study, for all five years prior to the bankruptcy. Only 63 firms met this criterion.

So that all the bankruptcies studied would represent failures, I also excluded one "intentional" bankruptcy from the sample, leaving a potential group of 62 bankrupt firms. I defined intentional bankruptcy as bankruptcy used as a legal tactic to cope with onerous labor contracts, product liability or antitrust suits, or hostile takeover attempts.

The matching process. Three independent judges identified a matched survivor for each bankrupt firm. The match was a firm that (1) closely resembled the bankrupt firm in sales size and product-market mix five years prior to the bankruptcy and (2) was not in the process of failing. This latter criterion was deemed satisfied if the match was as profitable as firms in the top half of its industry in the year of bankruptcy or if it had survived at least three years beyond the bankruptcy date. Appendix A contains a detailed description of the matching process. Five bankrupts could not be matched, leaving a potential sample of 57 matched pairs: 33 in manufacturing, 16 in retailing, and 8 in transportation.

The sample selection and matching process controlled for two commonly cited causes of bankruptcy: liabilities of newness and smallness. The median-sized firm in the sample had approximately \$100 million in sales. (The range was \$25 million to \$1.5 billion.) These size requirements resulted in a sample that approximately controlled for age. All firms were at least nine years old, which is well beyond the age of liability for newness.

The success of the matching process was verified using a logistic regression analysis on the bankrupts and their matches. This analysis showed that organizational age, size (sales or number of employees), and environmental conditions (real demand-growth rate and variability in the primary and secondary lines of business) were not associated with bankruptcy at any time between the fifth year and the last year before bankruptcy.

Data Sources and Time Frame

All data were gathered from archival sources. Financial data were taken from *Moody's Manuals*. The environmental data were collected from Department of Labor and Interstate Commerce Commission publications. Management data were taken from Dun and Bradstreet's *Directory of Corporate Managements*. The data were collected for both the matched and the bankrupt firm for a period of five years preceding each bankruptcy. I designated the fifth year before bankruptcy as $T - 5$, the fourth year preceding it as $T - 4$, and so forth. Data on earlier years could not be collected because of limitations in the information contained in the *Directory of Corporate Managements*.

Measuring Decline and Classifying Firms by Patterns of Decline

Financial resources. The financial resources of the firms studied were measured with a single variable: equity divided by total debt. This variable reflects the unused borrowing capacity of a firm because it is the inverse of the leverage ratio. A firm with a low equity to debt ratio, or high leverage, cannot borrow as much as it could if it had a high equity to debt ratio (low leverage). I chose equity divided by debt as a measure of financial health over return on assets or equity because Casey and Bartczak (1984) found that return and cash flow variables are not as good barometers of bankruptcy as balance sheet variables like equity over debt. In any event, equity over debt is highly correlated with return on assets for this sample ($r = .80$, $p < .001$, in year $T - 1$). In addition, measures of financial liquidity, such as the current ratio¹ and the ratio of working capital to total assets, are highly correlated with equity over debt (both Spearman r 's = .51, $p < .001$, in $T - 1$). Thus, equity over debt is a good proxy for the overall financial resources available to a firm.

Managerial resources. The prestige of the top-management teams of the same firms was measured using a scale composed of the sum of five standardized items ($\bar{x} = 0$, s.d. = 1) that captured the top managers' status as evidenced by their educational and professional affiliations. Although all top managers of large organizations can be considered part of the "power elite" (Giddens, 1972: 348; Mills, 1958: 11), there is an inner circle within the managerial elite whose members differ significantly from the larger elite

¹ The current ratio is current assets divided by current liabilities.

with respect to their educational characteristics and professional affiliations (Allen, 1978; Useem & Karabel, 1986).

Prestigious professional affiliations were measured using three items that captured the board memberships of each firm's top managers: (1) the number of outside boards that the CEO sat on, (2) the number of officers who sat on outside boards, and (3) the total number of outside boards upon which the officers sat. For the purposes of these measures, officers included vice presidents and their superiors, corporate secretaries, general counsels, controllers, and treasurers. An outside board was a board of directors of a profit-making firm other than the firm employing an officer. Previous research (Clement, 1977; Domhoff, 1967; Dye, 1983; Porter, 1957; Warner & Abegglen, 1955) has found multiple board memberships to indicate membership in the inner circle of the managerial elite.

Prestigious educational affiliations were captured using two measures. First, I used the average education of a team's members because I presumed that professional managers add more credibility to a top team than do uneducated managers (Baker, 1982; Blau & Duncan, 1967; Chandler, 1977; Clement, 1977). I derived average education by measuring each officer's level of education with a scale ranging from 1, did not graduate from high school, to 7, holds a Ph.D. degree. Second, the percentage of members of a top team that graduated from elite undergraduate institutions, such as Ivy League schools and a small number of highly respected research universities like MIT, was used because I presumed that association with elite universities creates more credibility and prestige than does association with less visible schools (Baltzell, 1958; Clement, 1977; Domhoff, 1967; Mills, 1958). This item ignores the prestige effect of schools that have middle-level or regionally good reputations. Unfortunately, measuring such prestige effects is very difficult. Many differences of opinion would result in coding the 2,000 officers included in this study. Therefore, I chose the narrower, more reliable, and, hence, more conservative measure of elite schools.

The prestige scale demonstrated good reliability in T-1 ($\alpha = .77$) and maintained its reliability over the entire time frame of this study. Cronbach alphas never fell below .75 for any period. The prestige scale's construct validity was also high. Each of the five items correlated highly with prestige.² The average Pearson correlation coefficient of the items with the scale was .72, with a range of .52 to .81, all significant at the $p < .001$ level. In addition, prestige was not highly correlated with a top team's size.

Internal resource munificence. In order to capture both the financial and managerial aspects of decline, I developed a composite variable, labeled the D-score. The D-score combines two variables, equity over debt and prestige, into one index of the internal resource munificence of each firm. Both

² Correlations between each item and the scale can be seen as each item's factor loading onto the prestige scale.

variables were standardized ($\bar{x} = 0$, s.d. = 1), and they were not correlated in any of the five years preceding bankruptcy. The rationale for this index lies in the fact that each variable contributes to the overall internal munificence of a firm, but neither fully captures the availability of important resources.

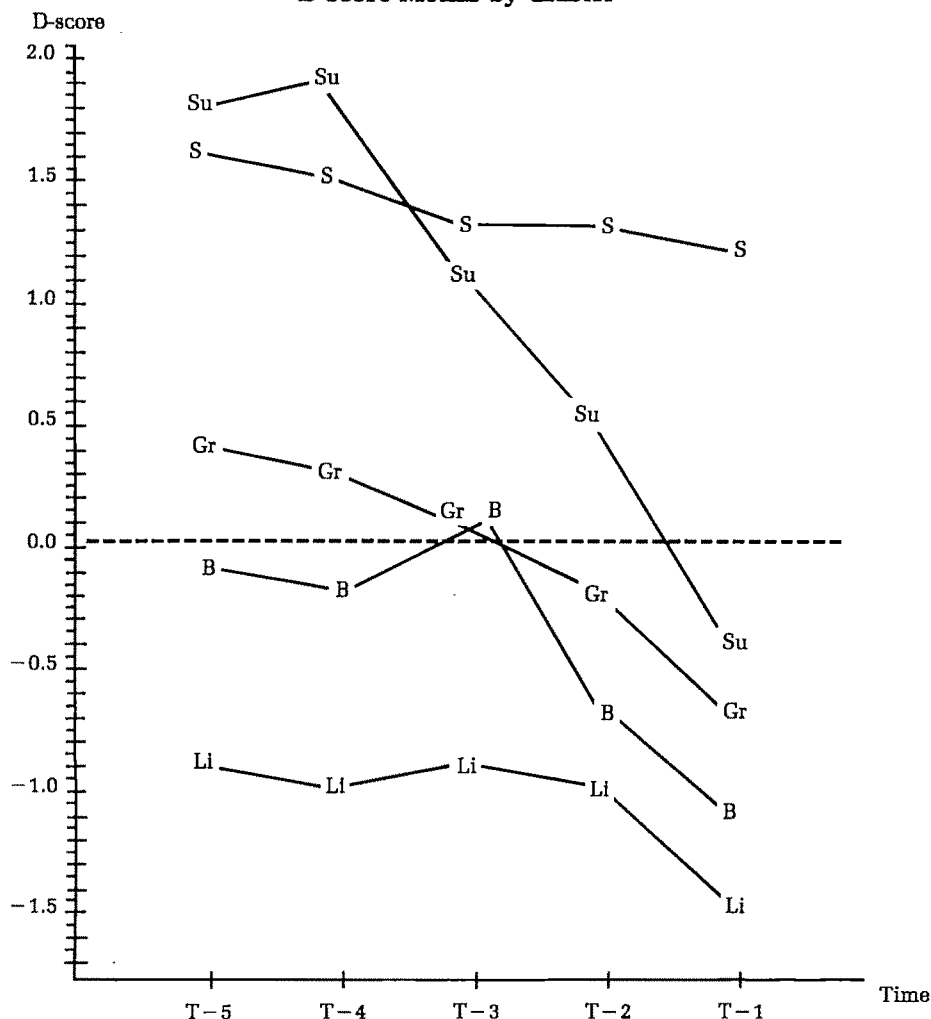
The weighting of equity over debt and prestige in the D-score was established by estimating a function that discriminates between the bankrupts and their matched survivors as of the last fiscal year-end prior to the bankruptcy ($T - 1$). The empirically derived discriminant function was $D\text{-score} = (1.84 \times \text{equity/debt}) + (0.528 \times \text{prestige}) + 0.11$. Because the D-score is an empirically derived discriminant function, it is an index that weights financial and managerial resources in a way that maximizes ability to predict failure. A low D-score, for example, indicates a high probability of a firm's being a bankrupt in $T - 1$. The D-score can be used as a measure of decline because a firm's probability of failing over time can be tracked. As a firm's D-score decreases over time, the firm declines because its chances of failure increase and its managerial and financial resources are declining.

The D-score captures the decline phenomenon that it was intended to measure. As expected, on the average, survivors and bankrupts have different patterns of D-scores over time (see Figure 2). The results of *t*-tests comparing bankrupts to their matched survivors indicate that the bankrupts' means are significantly lower than the survivors' in years $T - 5$ to $T - 1$ ($p < .001$ in all years, except $T - 3$, where $p < .04$). Most of the slippage in the bankrupts' D-scores occurs from year $T - 3$ to year $T - 1$. In *t*-tests comparing bankrupts to themselves in the previous year, the bankrupts do not differ significantly from $T - 5$ to $T - 4$ or from $T - 4$ to $T - 3$. However, from $T - 3$ to $T - 2$, the bankrupts are not quite significantly different at the $p < .14$ level. From $T - 2$ to $T - 1$, the difference is significant ($p < .02$). In contrast, *t*-tests comparing survivors to themselves in the previous year show that the survivors' means do not differ significantly over time.

Classifying the bankrupt firms by pattern of decline. The bankrupt firms were classified into patterns of decline by cluster-analyzing the failing firms using each firm's profile of D-scores from the fifth to the last year before bankruptcy. Seven firms had to be dropped from the analysis because financial data were missing. I also dropped an extreme outlier from the analysis because it distorted the clustering: in one year, the firm had issued a massive stock offering but had had almost no debt. This highly unusual case resulted in a very high equity to debt ratio and a D-score that was 27 standard deviations from the mean. These exclusions left a sample of 49 failing firms.

Ward's minimum variance hierarchical clustering algorithm (available in SAS) was used. This algorithm clusters firms using the squared Euclidean distance between them. Figure 2 shows the mean D-scores over the five-year study period for the three-cluster solution that resulted from this analysis. The cubic clustering criterion was maximized at the three-cluster solution, and the semipartial *R*-squares associated with the four- to six-cluster solu-

FIGURE 2
D-score Means by Cluster^a



^a Su = Means for bankrupt cluster 3 (sudden decliners, $n = 5$).

Gr = Means for bankrupt cluster 2 (gradual decliners, $n = 19$).

Li = Means for bankrupt cluster 1 (postdecline lingerers, $n = 25$).

S = Mean for all survivors ($n = 57$).

B = Mean for all bankrupts ($n = 49$).

tions dropped off significantly, indicating that the three-cluster solution is the best from a statistical point of view.

The high correlations between D-scores at T-5, T-4, and so forth were expected to produce some error in the Euclidean distance measure. However, a qualitative review of the clustering results indicated that the high correlations did not have much effect on the purity of the clusters. Individual firms in the clusters almost always showed the same patterns of D-scores

over time as the cluster's average. Only three or four firms showed patterns that were far enough away from their cluster centroid to suggest that they should be considered peripheral to their cluster. A review of clustering solutions based on as many as six clusters indicated that the original three clusters were very homogeneous.

There were 25 firms in cluster 1, 19 in cluster 2, and 5 in cluster 3. At each point in time, *F*-tests indicated that the clusters' means were significantly different at the .001 level; thus, the data do not support the joint hypothesis that the means for the three clusters are equal in any year studied.

Clusters 1 to 3 identified three types of declining firms: lingering firms, gradually declining firms, and rapidly declining firms. I labeled the clusters on the basis of the level of each cluster's *D*-score and the significance of changes in those levels. For example, the cluster 2 firms were labeled gradual decliners because they had high *D*-scores (>0) five years before bankruptcy ($T-5$), but they had completed their declines in $T-1$, just before they went bankrupt, showing low *D*-scores. The average *D*-scores in $T-1$ and $T-5$ for cluster 2 firms were significantly different ($p < .05$). In contrast, cluster 1 firms appeared to linger in a postdecline state from at least $T-5$ to $T-1$, exhibiting an average *D*-score significantly lower ($p < .05$) than those of the gradual decliners in $T-5$. Moreover, the cluster 1 firms did not appear to be declining—their average *D*-score in $T-5$ was not significantly different from the average in $T-1$. Because Dun and Bradstreet did not publish management data for a substantial portion of the sample for the years prior to $T-5$, it was impossible to test whether the lingerers had suffered a decline in *D*-score before the period shown in Figure 2.

However, the lingerers did exhibit a substantial decline before the fifth year prior to bankruptcy in one component of their *D*-scores. On the average, the lingerers' equity to debt ratio fell significantly ($t = -2.34$, $p < .02$), from .64 (s.d. = 0.35) in $T-10$ to .43 (s.d. = 0.25) in $T-5$. An informal review of the small number of firms for which management data from before $T-5$ were available indicated that the lingering firms also declined with respect to their managerial assets.

In contrast to the results based on data from the failing firms, a similar cluster analysis of the matched survivors did not yield the same patterns of decline over time, no matter what cluster solution was observed. In general, the survivors clustered into groups that exhibited stable *D*-scores over time at levels well above those of the failing firms.

Measuring Strategic, Managerial, Environmental, and Size Variables

Strategic variables were assessed through measures of domain initiative (Hypothesis 1a) and downsizing activities (Hypothesis 1b). The managerial variables were percentage measures of the composition of the top-management teams by functional background (Hypotheses 1d and 1e). I assessed the amount of centralization around the CEOs (Hypothesis 1c) using formal titles and measured environmental variables using measures of in-

dustry demand growth (Hypothesis 3a) and demand uncertainty (Hypothesis 3b). Finally, I measured size-related variables with accounting measures of fixed assets (Hypothesis 3c) and total long-term debt (Hypothesis 3d). Appendix B defines these measures and summarizes the sources of the data used.

The variables listed in Appendix B were calculated as two-year averages to smooth out momentary fluctuations. I based the two-year averages on two periods, $T-5$ to $T-4$ and $T-2$ to $T-1$, to capture any timing differences that might exist. The period $T-5$ to $T-4$ was treated separately from the period $T-2$ to $T-1$ because $T-3$ was a turning point for the failing firms; it was the year that the average D-score began its decline among the bankrupt firms.

Data Analyses

Several analyses were undertaken. I compared the lingerers to their matched survivors in $T-5$ to $T-4$ to test for hypothesized postdecline characteristics that healthy, nondeclining firms should not exhibit. The lingerers were also compared to gradually declining firms at $T-5$ to $T-4$ and $T-2$ to $T-1$ as a test for the hypothesized differences in the timing of the consequences of decline and the onset of bankruptcy that accompany different patterns of decline. Because the cluster results assigned only five firms to cluster 3, these firms were not used as a standard of comparison. The small number of firms in cluster 3 (sudden decliners) makes statistical analysis involving this category meaningless. Since directional hypotheses have been provided, all statistical tests were one-tailed.

RESULTS

Descriptive Statistics

Table 1 reports the intercorrelations among the managerial, strategic, size-related, and environmental variables used in the hypotheses. This matrix is based on two-year averages as of $T-5$ to $T-4$. The results indicate that two variables, exits and entries, were very highly correlated, suggesting a need to check for multicollinearity in some of the analyses performed. In addition, some of the managerial variables were modestly correlated among the bankrupts but not among the survivors, or vice versa. I was not, therefore, able to combine any of the management variables into meaningful scales that could be applied throughout the study, especially since I have frequently compared the bankrupts to the survivors in the same analyses.

Hypothesis 1

The first group of hypotheses predicted several strategic and managerial consequences of decline. I tested them using *t*-tests and logistic regression analyses; their results appear in Tables 2 and 3, respectively. These analyses compared the postdecline lingerers to their matched survivors in $T-5$ to $T-4$. Because of the matching process, these analyses controlled for orga-

nizational size and environment. Size-related and environmental variables were included in the multivariate analyses because the most conservative approach was to include the control variables as a way to ensure that the matching worked and that parameter estimates in which all else was equal were obtained. Only one size-related variable (long-term debt) appears in model 1 (Table 3). Net fixed assets, total assets, and sales were not significant, nor did they yield results that contradicted the statistical inferences presented. Finally, tests indicated that multicollinearity between exits and entries did not affect the results.

The results indicate support for most of the hypotheses. Hypothesis 1a, which predicted that postdecline firms would exhibit strategic paralysis, received partial support. According to both the univariate and multivariate tests, the postdecline firms showed less merger and acquisition activity. Contrary to the hypothesis, the data do not support the assertion that postdecline firms enter fewer new lines of business. However, on reflection, this result also indicates a form of strategic paralysis, because the postdecline firms are not attempting more diversification as a means of escape.

Hypothesis 1b, which predicted that postdecline firms would show considerably more downsizing activity, was partially supported. According to both the univariate and multivariate tests, the postdecline firms showed significantly more liquidations and divestitures. Both tests also showed that, contrary to the hypothesis, the data do not support the assertion that postdecline firms drop more lines of business. However, on reflection, this may represent a further elaboration of the strategic paralysis hypothesis (1a): postdecline firms appear to liquidate more subunits, but they do not change strategically because they do not exit business in which they are weak.

The logistic regression analysis weakly ($p < .10$) supported Hypothesis 1c, which predicted that postdecline firms centralize as part of a threat-rigidity response. Postdecline firms show evidence of more supervision of underlings by their CEOs. The data partially supported Hypotheses 1d and 1e, which suggested certain managerial imbalances would result from a threat-rigidity response. According to the multivariate results, the postdecline firms had fewer R&D, throughput, and marketing people among their top managers, indicating that the firms had deemphasized critical functions. The *t*-tests also showed evidence of more financial people, indicating that the bankrupts emphasized efficiency and financial concerns.

Finally, *t*-tests (Table 2) indicate that most of the predicted differences between postdecline lingerers and their matched survivors persisted into years $T-2$ to $T-1$. Thus, the lingerers show no evidence of reversing the consequences of decline during their lingering period.

Hypothesis 2

The data supported the hypotheses predicting differences in the timing of the consequences of decline among the gradual decliners and the lingerers. Hypothesis 2a predicted significant differences in $T-5$ to $T-4$ because the lingerers are in a postdecline condition but the gradual decliners have

TABLE 2 (continued)

Variables	Two-year Average (T-5 to T-4)				Two-year Average (T-2 to T-1)			
	Means ^b		Significance Levels		Means ^b		Significance Levels	
	Lingers	Survivors	Gradual Decliners	Lingers Versus Survivors	Lingers	Survivors	Gradual Decliners	Lingers Versus Survivors
Legal people	16.56 (14.36)	12.81 (9.34)	11.85 (8.99)		14.95 (10.37)	12.86 (8.76)	12.92 (7.18)	
Throughput people	9.91	18.62	16.70	**	8.96	21.25	14.04	***
Financial people	28.73 (12.72)	21.87 (13.85)	23.76 (15.01)	*	31.83 (9.99)	25.35 (14.89)	29.11 (14.97)	+
CEO span of control	23.86 (14.81)	18.04 (13.56)	19.29 (20.61)		22.48 (18.04)	20.07 (13.51)	25.38 (15.79)	
Size	18.13	18.52	19.64		15.79	18.43	22.00	
Net fixed assets	88.6 (110.0)	124.5 (241.8)	59.0 (79.8)		104.1 (162.4)	182.7 (327.3)	75.9 (113.4)	
Long-term debt	90.2 (98.7)	49.0 (58.7)	44.2 (57.7)	*	104.2 (129.2)	67.5 (77.1)	79.9 (153.9)	

^a For the lingers and survivors, $n = 25$; for the gradual decliners, $n = 19$.

^b Standard deviations are in parentheses.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 3
Results of Logistic Regression Analysis Using the Two-Year Average
for the Fourth and Fifth Years Before Bankruptcy

Variables	Parameter Estimates ^a		
	Model 1: Lingers Versus Matched Survivors	Model 2: Lingers Versus Gradual Decliners	Model 3: Lingers Versus Gradual Decliners
Management			
R&D people	-.56*** (.00)	-.47*** (.00)	-.35 (.77)
Marketing people	-.11* (.07)		-.11* (.07)
Legal people	.07 (.06)	.09† (.07)	.03 (.06)
Throughput people	-.11** (.07)	-.12* (.06)	-.11** (.05)
Financial people	.03 (.05)	-.01 (.04)	.01 (.04)
CEO span of control	.04† (.03)	.07* (.04)	
Strategy			
Entries	-1.52 (1.52)	1.19 (1.16)	.64 (1.16)
Mergers and acquisitions	-2.68* (1.58)	-2.37† (1.91)	-1.70 (1.52)
Exits	.80 (1.60)	-3.44* (1.85)	-2.62* (1.39)
Liquidations and divestitures	2.25** (.96)	1.17† (.76)	.64 (.65)
Control variables			
Long-term debt	.02* (.01)	.02* (.01)	.01† (.01)
Industry growth	-.04 (.07)	-.12* (.07)	-.08† (.06)
Industry uncertainty	.22 (.15)	.14 (.16)	-.00 (.16)
Intercept	-4.08 (2.66)	-1.04 (1.91)	2.82 (2.39)
Overall χ^2	35.70 ₁₃ ***	26.25 ₁₂ ***	26.10 ₁₂ **

^a Two variables were dropped from the logistic regression models because of multicollinearity. Standard errors are in parentheses. In all models, lingers = 1; matched survivors or gradual decliners = 0.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

not yet declined at that time. I tested this prediction using t-tests and logistic regression analyses, whose results appear in Tables 2 and 3, respectively. Models 2 and 3 in Table 3 show the results of two logistic regression analyses comparing the strategic and managerial characteristics of postdecline linger-

ing firms with those of the predecline gradual decliners in $T-5$ to $T-4$. These analyses control one size-related characteristic (long-term debt) and two environmental characteristics, industry growth and demand uncertainty, both in the firms' primary lines of business. Because of a problem with multicollinearity between the variables measuring marketing people and CEO span of control in this particular subsample, I dropped the marketing people variable from model 2 and CEO span of control from model 3. Finally, tests indicated that multicollinearity between exits and entries did not affect the results.

As predicted in Hypothesis 2a, both the univariate and multivariate analyses showed that the lingerers were significantly different from the gradual decliners in years $T-5$ to $T-4$. With some minor differences in results, these analyses generally yielded the same conclusions as the analyses comparing lingerers to their matches in those years. According to the multivariate tests, the lingerers have fewer R&D, marketing, and throughput people, and they evidence more centralization of authority around the CEO ($p < .05$). Although the lingerers do not show any significant evidence of having more financial people, they do show evidence of having more legal people, as predicted. Also as predicted, the lingerers show modest evidence of lower merger and acquisition activity ($p < .10$ in both univariate and multivariate tests) and higher liquidation and divestiture activity ($p < .05$ in univariate tests). Thus, the results generally supported Hypothesis 2a.

The logistic regression equations shown in Table 3 indicate an unexpected result. It was predicted that lingerers would drop more lines of business than would firms that had not yet declined. The logistic analyses indicated that the lingerers did not engage in more exits than their matches and, more interestingly, they engaged in fewer exits than the gradual decliners in the $T-5$ to $T-4$ period. That pattern suggests that the lingerers may have designed their liquidations merely to generate cash, without any strategic change. Post hoc, this finding further confirms that postdecline firms suffer strategic paralysis.

Hypothesis 2b predicted that the strategic and managerial differences between gradual decliners and lingerers would evaporate by the second year before bankruptcy, when both are in a postdecline state. I tested this hypothesis by comparing the gradual decliners to the lingerers in $T-2$ to $T-1$. As expected, the differences reported for $T-5$ to $T-4$ were not present in the later period. The statistics from the t -tests (Table 2) show that, once the gradual decliners have completed their decline in $T-2$ to $T-1$, most of the differences are less pronounced. I do not present logistic regression analyses for $T-2$ to $T-1$ in Table 3 because their results were not significant. Thus, findings support Hypothesis 2b.

Hypothesis 3

Hypotheses 3a to 3d predicted that the lingerers would have some characteristics in the fourth and fifth years before bankruptcy ($T-5$ to $T-4$) that the gradual decliners would not have in $T-2$ to $T-1$. These characteristics were proposed as explanations for the lingerers' ability to delay the onset of

bankruptcy after decline. I also proposed that lack of these factors explained why the gradual decliners were not able to delay bankruptcy after they declined.

The results of *t*-tests, presented in Table 4, support Hypothesis 3a, which predicted that lingerers were able to linger because buoyant environments with growing demand saved them from immediate bankruptcy. In contrast, the gradual decliners died immediately after they declined because their environments were hostile (declining). In years T-5 to T-4, the lingerers were in significantly faster-growing lines of business than the gradual decliners were in when they declined, in T-2 to T-1. Furthermore, by T-2 to T-1, the lingerers' environments were declining at rates similar to those of the gradual decliners. Thus, the lingerers went bankrupt when their buoyant environments evaporated.

The results shown in Table 4 do not support Hypotheses 3b to 3d. Environmental (demand) uncertainty, ability to liquidate fixed assets, and creditor commitment do not appear related to the ability to delay bankruptcy after a decline.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

This study makes two types of contributions. First, it defined and measured organizational decline in a new way, treating decline as a pattern of decrease over time in a firm's internal resources as measured by an index of internal resource munificence. The index is consistent with previous definitions (Cameron et al., 1988) but also extends those definitions by combining two aspects of decline, declining human (managerial) and monetary resources, into one definition. The index also extends previous definitions

TABLE 4
Results of *t*-tests Comparing Lingerers to Gradual Decliners

Variables	Means*			Significance Levels	
	Gradual Decliners, T-2 to T-1	Lingerers, T-5 to T-4	Lingerers, T-2 to T-1	Lingerers, T-5 to T-4, Versus Gradual Decliners, T-2 to T-1	Lingerers, T-2 to T-1, Versus Gradual Decliners, T-2 to T-1
Long-term debt	79.9 (153.9)	90.2 (98.7)	104.2 (129.2)		
Net fixed assets	75.9 (113.4)	88.6 (110.0)	104.1 (162.4)		
Industry growth	-0.99 (7.84)	5.13 (7.33)	-2.64 (7.42)	**	
Industry uncertainty	7.65 (4.97)	8.15 (5.37)	6.97 (4.45)		

* T-5 to T-4 are two-year averages based on the fifth and fourth years before bankruptcy; T-2 to T-1 are two-year averages based on the second and last years before bankruptcy. Standard deviations are in parentheses.

** $p < .01$

by including aspects of organizational legitimacy that are created by managerial resources (D'Aveni, 1989).

Second, the results indicate four important findings about the timing and nature of the strategic and managerial consequences of organizational decline. First, results confirmed the existence of different patterns of decline. Second, these patterns of decline are related to the timing of the consequences of decline. Third, the consequences of decline include managerial imbalances, actions concerned with efficiency, centralization effects, and strategic paralysis, all reflecting threat-rigidity responses. Finally, firms may delay or even avoid bankruptcy if their environment is sufficiently buoyant (growing) to support a resource-deficient firm.

One of the more interesting and unexpected findings was that size-related characteristics do not seem to affect the length of a postdecline lingering period. The lingerers did not have more fixed assets, indicating they had no greater ability to downsize assets than other failing firms had. The lingerers also did not have more debts, indicating no greater potential for encouraging creditor commitment than other failing firms had.

It should be noted, however, that these size-related conclusions may have limited applicability because the sample included only large bankrupt firms. Moreover, the imperfect measurement of ability to downsize operations may have influenced results. Perhaps saleable assets would be a better measure than the only available proxy variable, net fixed assets, which this study used. Net fixed assets include assets that may not be saleable and hence are useless for downsizing. Similarly, the average size of creditor losses may be a better measure than the only available proxy, long-term debt, which this study used. Long-term debt fails to consider the importance of the size of a potential loss relative to the total assets of each of a firm's various creditors. Thus, future research may identify the same kind of commitment on the inter-organizational level of analysis that Staw (1976) and others have found at the individual level of analysis.

Although lingering among medium-sized and large firms may or may not be size-related, downsizing actions may aid lingering. However, the effectiveness of downsizing actions depends on environmental conditions. If an environment continues to improve (i.e., demand grows), the consequences of decline are not dysfunctional. Downsizing and efficiency actions buy time in which an environment can improve and enable a firm to reverse its decline. However, if an environment worsens, downsizing and efficiency actions are insufficient because they do not change a firm's strategic direction or move it to a more favorable environment. Thus, postdecline firms linger only as long as their environment remains supportive.

Downsizing operations may buy time, but it does not necessarily buy a turnaround. If a downsizing firm gets lucky, environmental factors may save it. If the firm is unlucky and its environment becomes more hostile, downsizing and efficiency actions are only fuel for temporarily perpetuating the lingering paralysis. When downsizing is used in this manner, an organiza-

tion is in the process of demise, that is, the prebankruptcy disbanding of organizational assets, which is, at best, bankruptcy without the name.

Downsizing assets may become part of a firm's problem because it can become a narcotic-like habit, providing an illusion of temporary well-being that gets harder to maintain as a firm exhausts its supply of nonessential subunits. Moreover, from the perspective of shareholders, an early bankruptcy may be preferable to a slow demise. At least bankruptcy provides relief from constant cash crises and gives protection from immediate asset seizures and liquidations forced by creditors.

Further study of successful downsizing strategies may reveal that piecemeal downsizing is just a way to increase a firm's luck. Such a study might also reveal that piecemeal downsizing is not as successful as major retrenchment, which generates cash for more than debt service. To succeed in hostile environments, downsizing assets may have to buy more than time by creating enough slack to fund significant diversification efforts and strategic change.

The results of this study suggest, however, that postdecline managerial imbalances may inhibit the use of downsizing as a source of funds for significant domain change and other turnaround strategies. A functionally unbalanced top management in the years well before a bankruptcy occurs (here, years $T - 5$ and $T - 4$) may be both the consequence of previous (before the fifth year preceding bankruptcy) organizational problems and, at the same time, the antecedent of future (after the fifth year) organizational problems.

Although this view suggests that managerial action is the source of turnaround behavior, it must be tempered by recognizing that managerial variables are not solely responsible for strategic actions. Industry exit barriers, for example, may also trap some firms in situations they cannot escape (Porter, 1980). Further research is needed to answer questions about environmental factors that trap postdecline firms in a state of paralysis.

Moreover, this study has not sought to confirm the causal connections that exist among the managerial and strategic variables it tested. The study is only a first attempt at confirming previous theoretical work on the timing and nature of differences between healthy and postdecline firms. Nor was this study designed to investigate the underlying reasons for the connections between managerial and strategy variables. Do the unbalanced managerial backgrounds of a firm's top managers, for example, make a difference because of the managers' cognitive limitations, the innovative orientation and training associated with various career tracks, or a lack of heterogeneity in the top team? These questions remain unanswered.

Finally, since this study did not look at postdecline firms that later turned around, no prescriptive conclusions can be drawn about appropriate turnaround strategies. Future research could address the extent to which changing managerial characteristics generates effective turnarounds by using a sample that includes firms with improving scores on the index of internal resource munificence used in this research. Such studies might also

consider turnaround strategies as actions that break the vicious trap created by decline. Recent studies of turnaround (e.g., Hambrick & Schecter, 1983) have not addressed the difference between breaking out of the postdecline trap and reversing decline while it is still in process. Future research on turnarounds may reveal that a successful turnaround strategy for lingering firms relies on the art of eliminating postdecline paralysis and managerial deficiencies. In contrast, successful turnarounds for gradually and suddenly declining firms may rely on the art of reversing the causes of decline.

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APPENDIX A

The Matching Process

The matching process had three stages. First, a research assistant identified a comprehensive set of potential matches for each bankrupt firm. All firms in a set had roughly the same sales volume as the bankrupt firm in the fifth year before bankruptcy (T–5), and all were listed in Ward's Business Directory under the bankrupt firm's top two (by sales volume) three-digit Standard Industrial Classification (SIC) codes or in Standard and Poor's published lists of firms by four-digit SIC codes. As with the bankruptcies, potential matches were excluded if they were not listed in the Dun and Bradstreet Directory of Corporate Management. The research assistant was otherwise lenient, so each list usually had 5 to 20 potential matches. Data on a firm's size and products and markets (from Moody's Industrial and OTC Manuals) for year T–5 and on its profitability in year T were included in a comprehensive file.

Second, three judges worked independently to select their first and second choices for matches from each file. The judges considered size and product-market mix (both in T–5) as equal primary matching criteria. Then they turned to profitability in year T and ruled out poor performers in that year. The profitability condition was imposed to eliminate survivors in year T that might have gone bankrupt after the time frame of the study.

The independent matching process resulted in at least two of the three judges' agreeing on first choices for 53 of the cases. For these 53, all three judges made the same first choice in 28 cases, and in 18 more cases, the dissenting judge had the majority's choice as his second choice.

The final step was to resolve the 9 disputed cases. The judges reached a negotiated consensus for 4 of the cases but concluded that the other 5 had no satisfactory matches. Thus, the final number of matched pairs was 57. After matching was complete, 8 other pairs were eliminated from some of the analyses because of missing financial data or inability to classify them by pattern of decline. This left a final sample of 49 matched pairs.

APPENDIX B

Measurements^a

Strategy Constructs and Variables

Domain initiative was measured with (1) mergers and acquisitions, the number of wholly owned subunits acquired by or merged into a firm (source A) and (2) entries, the number four-digit SIC codes added to a firm's portfolio (source B).

^a Key to the data sources listed:

A = Moody's Industrial Manual and Moody's OTC Manual.

B = Dun and Bradstreet's Million and Billion Dollar Directories.

C = Dun and Bradstreet's Directory of Corporate Managements.

D = U.S. Census Bureau and Department of Commerce publications, including Annual Survey
(continued)

Downsizing was measured with (1) liquidations and disposals, the number of wholly owned subunits liquidated or disposed of (source A) and (2) exits, the number of four-digit SIC codes dropped from a firm's portfolio (source B).

Management Constructs and Variables

Top team composition was measured with (1) financial people, the percentage of top team members whose dominant career background was in the financial or accounting functions, (2) legal people, the percentage of top team members whose dominant career background was as an attorney or as an employee in a corporate counsel's office, (3) marketing people, the percentage of top team members whose dominant career background was in sales or marketing, (4) R&D people, the percentage of top team members whose dominant career background was in R&D, and (5) throughput people, the percentage of top team members whose dominant career background was in production or internal operations. For retailers, operations included store management and warehousing and purchasing functions. For transportation firms, operations included maintenance, scheduling, and other operations. The top team included all officers as defined in the body of this article. (All source C.)

Note that for any given firm, these five top management team variables do not sum to one. Several functional background categories that were coded (e.g., general management, personnel, etc.) were not included in this study.

CEO's control or supervision over members of the top management team, a form of centralization, was measured with CEO span of control, the percentage of members of the top team whose formal titles indicated that they were on the hierarchical layer immediately below the CEO (source C).

Environmental Constructs and Variables

Industry growth was measured with industry demand growth, the annual percentage growth rate in total industry revenues (source D) in real dollars for the firm's primary four-digit SIC code (source B).

Industry uncertainty was measured with industry demand uncertainty, the variability in annual industry demand growth rates calculated as the mean percentage deviation of the actual demand growth rate from the five-year average demand growth rate (source D). In specific, this variable used the demand growth rates for a firm's primary four-digit SIC code (source B) for the five years leading up to the year in question.

Common measures of variability, such as the standard deviation, were not appropriate here since demand growth showed systematic trends over the five-year period for many lines of business. To account for such trends, the measure chosen was the mean absolute value of the percentage deviation of the actual demand growth rate from the trend, developed by Lev and Kunitzky (1974). This value will be close to zero when the actual growth rates in a series do not deviate much from the systematic trend, indicating a smooth, or certain, series. If the rates fluctuate wildly, this value will be large, indicating uncertain future demand growth rates.

Size-Related Constructs and Variables

Asset downsizing ability was measured using a firm's net fixed assets in millions of dollars (source E). A measure of saleable assets was unavailable, so net fixed assets was used as a proxy.

Creditors' commitment was measured with a firm's long-term debt in millions of dollars (source E). Long-term debt was used as a proxy for this construct because it is a measure of aggregate losses suffered by creditors of a bankrupt firm. Better measures, such as the average

of Manufacturers, Industrial Outlook, Statistical Abstracts, Current Business Reports, and similar reports of the Federal Aviation Administration and the Interstate Commerce Commission for the transportation industries.

E = Financial statements from *Moody's Industrial Manual* and *Moody's OTC Manual*.

EFFECTS OF SMOKING CESSATION

Although popular folklore maintains that smoking cessation has side effects, there has been surprisingly little empirical research on the effects of cessation (Manley & Boland, 1983). The research that does exist focuses primarily on the two weeks following cessation and clearly indicates that increased hunger and weight gain, constipation, irritability, insomnia, light-headedness, inability to concentrate, restlessness, tremors, craving for cigarettes, headaches, and nervousness, resulting in increased anxiety, accompany cessation (Brecher, 1972; Guilford, 1966; Horn, 1970; Knapp, Bliss, & Wells, 1963; Larson & Silvette, 1968, 1971; Schiffman & Jarvik, 1976).

Most individuals want to stop smoking to increase personal health and longevity. In the long run, smoking cessation should lead individuals to think of themselves as healthier and, in fact, they are likely to enjoy better health after they have stopped smoking. However, short-run perceptions about health may not be the same as long-term perceptions, especially since the research cited above suggests that many physical symptoms related to poor health accompany the cessation of smoking. Hence, we hypothesized that, in the short run, people who stop smoking will give lower appraisals of their health than will people who do not smoke or who continue smoking.

MOOD, INFORMATION PROCESSING, AND JOB SATISFACTION

Clearly, psychological and physiological withdrawal from smoking has a negative impact on a person's overall mood, accompanied by an increased appetite and resultant weight gain. But how might this shift in personal mood be related to work perceptions and work behavior?

Motowidlo (1986) developed an information-sampling model of personnel decisions based on the view that attitudes like job satisfaction are willfully constructed judgments of a job (Salancik & Pfeffer, 1978). Incorporating the empirical research by Bower (1981), Clark and Isen (1982), and Tversky and Kahneman (1973), Motowidlo suggested in his model that information processing occurs in two simultaneous steps: (1) individuals encode present job observations or experiences in the form of memory and (2) encode their own current mood in a manner that associates this mood with the content of the experience or observation. When people are later asked to evaluate their job satisfaction, their mood at the time of retrieval influences the job-related information retrieved. This process occurs in such a manner that information stored in memory under a specific mood becomes more easily accessible if it is congruent with an individual's present mood: "People in a positive mood are more likely to recall positive information; people in a negative mood are more likely to recall negative information" (Motowidlo, 1986: 37). Hence, positive moods should bias individual judgment of job satisfaction in a favorable manner, and negative moods should bias judgments unfavorably.

Applying Motowidlo's model to this investigation, we posited that the negative shift in mood created by smoking cessation should cause individuals to judge their job satisfaction to be lower than they would otherwise.

When their mood is negative, people dwell on negative remembered information, thereby producing a negative evaluation of job satisfaction. A similar logic can be applied to individual judgments about job-related tensions.

Sharp changes in mood that negatively influence job attitudes may also result in increased absence from work. This view is consistent with the Steers and Rhodes (1978) model of absenteeism in which job satisfaction and a variety of external pressures, such as fear of losing a job, work group norms, and incentive systems, influence an individual's motivation to attend work. Smokers have higher rates of absenteeism (Terry, 1971), which is one of the motivators for employers' prohibiting smoking and encouraging cessation. But what are the short-run effects of smoking cessation? To the extent that it decreases job satisfaction and self-reported health, we hypothesized that stopping smoking will increase absenteeism in the short run.

SUMMARY OF HYPOTHESES

We propose that, in the short run, smoking cessation will significantly change an individual's mood, which will result in both negative perceptions about work and increased work absence. In line with past research, we believe that those who stop smoking will experience an increase in weight as a result of poor eating habits and increased appetite. People who have recently stopped smoking will also give lower appraisals of their health than will other individuals. To explore these hypotheses, this study identified four groups: individuals who had never smoked ($N = 206$), smokers ($N = 96$), exsmokers at the time the study began ($N = 86$), and people who stopped smoking during the study period ($N = 34$). By determining if the patterns of attitudes for these groups were significantly different, we tested the hypothesized implications of smoking cessation.

METHODS

Respondents and Procedures

The respondents were recruited from a small manufacturing division of a multinational chemical corporation and from a large health insurance company. Participation was voluntary and part of a larger research project evaluating the effectiveness of health promotion programs in work settings. Surveys were administered at the job sites during working hours. A community health team took weight and height measures, also during working hours.

The surveys were administered twice, 12 to 16 months apart. Attendance data were gathered for the 12 months prior to the first survey administration in each company and for 12 months afterwards, prior to the second survey administration. Managers were responsible for keeping track of employee attendance with one exception: time clocks monitored the attendance of union employees at one of the sites. At the time of the study, neither site had policies prohibiting smoking in the workplace, but both offered smoking cessation programs.

The respondents consisted of 138 men and 284 women and included individuals from all levels of the two organizations. The mean age was 35.2 years, with a range of 20 to 75 years (*s.d.* = 9.41). The group of recent exsmokers was the youngest; their mean age was 32.2 years.

Measures

The study measured variables for the following categories: mood; job perceptions and attitudes; absenteeism; and health, eating, and weight.

Mood included measures of quality of life, depression, anxiety, somatic complaints, and negative affect. The Appendix lists all items in the scales assessing those constructs. The quality of life instrument (Medical Datamation Inc., 1982) measured general life satisfaction and emotional well-being. Respondents ranked their level of comfort with themselves, their relations with others, their ability to meet life's demands, and their ability to enjoy life. This instrument employed 24 items anchored on a 7-point scale by "low or poor" and "high or good."

The depression, anxiety, and somatic complaints scales were developed from factor analysis of an individual strain measure constructed by Adams (1981). This factor analysis was derived from a sample of 646 individuals comparable to the subjects of this investigation (Manning, Williams, & Wolfe, 1988). These scales included 18 items that respondents rated on a 5-point response format ("rarely to never" to "quite frequently"). Representative items included "feel depressed or remorseful," "feel irritable," and "sweaty and/or trembling hands."

The negative affect scale from the Affect Rating Scale (Sipprelle, Gilbert, & Ascough, 1976) was employed to measure this construct. The scale consists of eight items anchored on a 7-point rating scale ranging from "not at all" to "very much." Respondents were asked to determine how well eight words, including fearful, angry, and bitter, described their general feelings.

The job perceptions and attitudes category included two measures: job satisfaction and job-related tensions. We measured job satisfaction by having respondents rate ten items on a 7-point scale ranging from "dissatisfied" to "satisfied" (Manring, 1979). The items related to specific aspects of jobs, such as the nature of the task, the quality of supervision, relations with people, and freedom to use personal judgment and initiative. The Appendix lists all ten job satisfaction items. The Job-Related Tension Index (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964) is an instrument consisting of 18 items scored on a 7-point scale ("never" to "nearly all the time"). Representative items included the following: "Feeling that you have too little authority to carry out the responsibilities assigned" and "Feeling that you have to do things on the job that are against your better judgment."

Absenteeism was assessed as the number of total hours of short-term (less than or equal to two days) and long-term (more than two days) absence. Time 1 absence measures covered the 12-month period prior to the administration of the first survey. Time 2 absence measures were computed by totaling absence for the 12 months following completion of the first survey.

We divided the absence figures by the number of months the employees had been employed each period. Therefore, these absence figures represent monthly averages.

Self-appraised measures of health and of eating habits and a measure of weight were also obtained from the respondents. For the first, we asked, "Considering your age, how would you describe your overall physical health?" A 4-point scale, from "excellent" to "poor," anchored this item. The eating habits scale (Mahoney Institute for Health Maintenance, 1984) consisted of ten items rated on a 7-point scale ("never" to "always"). Examples of the items are "I go on eating binges and feel out of control" and "I snack between meals." The Appendix gives the complete scale.

Individual weight and height were measured by a community health team. A weight ratio was obtained by dividing measured weight by ideal weight, an index dependent on height and gender. This ratio translates an individual's height and weight into an index of adiposity, or surplus of body fat. Kannell (1983) suggested that this measure is highly correlated to most other measures of adiposity.

To establish the categories of smoking behavior, respondents were asked to describe themselves as smokers or exsmokers or as never having smoked. Recent exsmokers were people who listed themselves as smokers at time 1 and as exsmokers at time 2. Although a self-report of smoking status is not the measure of first choice in the smoking cessation literature—biomedical verification is the standard—Pechacek, Fox, Murray, and Luepker (1984) indicated a reasonable correlation between self-reported smoking cessation and biomedical verification. As a further check on the validity of our self-report measure, interviews with individuals who reported they stopped smoking led us to conclude that these individuals did in fact curtail their smoking behavior.

RESULTS

Demographic Differences Between Smoking Groups

Cross-tabulated analyses of age, gender, education, and marital status were performed on the four smoking-behavior categories. Only in the case of gender were there significant differences in results. Almost equal numbers of men and women were in the recent exsmoker category, but fewer women quit smoking during the study. Women also made up a smaller percentage of the long-term exsmokers, but that was probably because women were less likely to smoke in decades past.

Analysis of Smoking-Group Differences

Data analysis was conducted in several stages. First, we computed zero-order correlations for time 1 and time 2 measures to assess the intercorrelation among study variables and the stability of relationships (Table 1). As expected, this analysis indicated significant intercorrelations for dependent variables within and between our four measurement categories. Overall, a

similar pattern of correlations appears in both time 1 and time 2 analyses. In addition, the test-retest correlations exceed .47, except for short-term absence (.28) and long-term absence (.00).

Because many of the dependent measures were intercorrelated, we considered the MANOVA procedure to be the most appropriate analytic technique for exploring differences among the smoking groups. This procedure compensates for variable intercorrelation and provides an omnibus test of any multivariate effect. Following this strategy, we computed a MANOVA with the results for the dependent measures from time 1 to test whether differences existed between smoking groups prior to changes in individuals' smoking status. This analysis was statistically significant ($F_{36,1227} = 1.38$, $p < .05$). To understand the underlying contributions of the variables to the significant multivariate effect, we computed means and univariate ANOVAs for the four groups for time 1 (Table 2). These results show that differences between the four smoking groups were significant on only one of the time 1 variables, eating habits ($F_{3,418} = 3.32$, $p < .05$). In this instance, a posteriori tests indicated that continuous smokers had a lower mean score on poor eating habits than the other three smoking categories—smokers who would become recent exsmokers at time 2, long-term exsmokers, and those who had never smoked. Although not significant at conventional levels, results of the ANOVA for short-term absence were close to significant ($F_{3,418} = 2.56$, $p < .10$).

To provide a proper multivariate test of the differences among smoking groups at time 2, unbiased by group differences at time 1, we controlled the entire set of time 1 measures with a covariance procedure in the time 2 analysis. The results of this multivariate analysis of covariance indicated a statistically significant difference between the smoking groups at time 2 ($F_{36,1191} = 2.02$, $p < .01$).

To interpret the significant multivariate F and clarify the differences between groups at time 2, we computed group means, univariate ANOVAs, and a posteriori contrasts for the time 2 dependent measures (Table 3). The only exception to this procedure was the computation of a univariate ANCOVA for the eating habits variable with time 1 eating habits held constant. The logic behind these procedures was that, at a univariate level, it only makes sense to control variables that produced a group main effect at time 1. Results indicated that 10 of the 12 dependent variables showed significant univariate differences. Within the mood category, recent exsmokers reported lower levels of quality of life, more depression, and higher levels of anxiety and negative affect. These findings for recent exsmokers were all significantly different from the findings for the other three groups. The same pattern existed with job satisfaction. For job-related tensions, recent exsmokers reported significantly higher job tension levels than continuous and long-term exsmokers; however, their scores were not statistically different from those of respondents who had never smoked.

Some differences in absenteeism emerged between the four smoking groups. Levels of short-term absence were highest for recent exsmokers and

TABLE 1
Pearson Correlations and Reliability Estimates for All Study Variables

Variables	Correlations ^a												Reliability Estimates
	1	2	3	4	5	6	7	8	9	10	11	12	Time 1 Time 2
Mood													
1. Quality of life	.73**	-.62**	-.59**	-.40**	-.68**	.47**	-.47**	-.05	-.01	-.38**	-.31**	-.10*	.93
2. Depression	-.58**	(.65)**	.77**	.66**	.74**	-.40**	.57**	.12**	-.01	.36**	.36**	.08*	.81
3. Anxiety	-.59**	.73**	(.59)**	.59**	.77**	-.41**	.54**	.08*	-.04	.31**	.31**	.03	.88
4. Somatic complaints	.39**	.75**	.59**	(.63)**	.50**	-.22**	.41**	.05	-.02	.29**	.28**	.07†	.71
5. Negative affect	-.66**	.67**	.73**	.51**	(.61)**	-.48**	.57**	.06	-.02	.29**	.32**	.05	.76
Job perceptions and attitudes													
6. Job satisfaction	.47**	-.41**	-.40**	-.30**	-.48**	(.51)**	-.63**	-.12**	-.07†	-.19**	-.12**	.05	.86
7. Job-related tensions	-.52**	.55**	.46**	.45**	.50**	-.59**	(.59)**	.03	-.06	.18**	.29**	-.03	.90
Absenteeism, hours/month													
8. Short-term	-.01	.17**	.10*	.20**	.08*	-.19**	.08†	(.28)**	.28**	.11**	.07†	.00	
9. Long-term	-.02	.08*	.03	.04	.08†	-.09*	.00	.20**	(.00)	.08*	.00	.02	
Health, eating, and weight													
10. Self-appraised health	-.37**	.39**	.30**	.40**	.38**	-.20**	.15**	.20**	.01	(.61)**	.28**	.22**	
11. Eating habits	-.25**	.21**	.35**	.29**	.30**	.13**	.18**	.10*	.04	.21**	(.80)**	.28**	.76
12. Weight ratio	-.05	.11**	.11**	.21**	.10*	-.03	.04	.15**	.04	.21**	.43**	(.78)**	

^aCorrelations in the lower triangle are for time 1 and those in the upper triangle are for time 2. Values in parentheses are test-retest correlations.

† $p < .10$

* $p < .05$

** $p < .01$

TABLE 2
Time 1 Means, Standard Deviations, and Analysis of Variance Results^a

Variables	Overall		Continuous Smokers		Recent Exsmokers		Long-term Exsmokers		People Who Had Never Smoked		F ^b
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	
Mood											
Quality of life	5.47	0.84	5.62	0.77	5.30	0.81	5.51	0.88	5.41	0.84	1.92
Depression	2.27	0.80	2.28	0.81	2.37	0.80	2.17	0.78	2.30	0.80	0.79
Anxiety	2.30	0.91	2.35	0.86	2.37	0.91	2.21	0.94	2.30	0.92	0.47
Somatic complaints	1.85	0.76	1.92	0.78	1.91	0.68	1.74	0.77	1.85	0.75	0.94
Negative affect	2.99	1.00	2.92	0.89	3.13	1.04	2.87	1.10	3.05	1.00	1.07
Job perceptions and attitudes											
Job satisfaction	4.83	1.24	4.79	1.43	4.79	1.15	4.87	1.17	4.84	1.20	0.08
Job-related tension	2.75	0.95	2.60	0.94	2.92	0.90	2.69	0.94	2.81	0.97	1.52
Absenteeism, hours/month											
Short-term	1.79	1.95	2.15	2.09	2.21	2.21	1.47	1.69	1.69	1.91	2.56†
Long-term	0.96	3.94	1.44	5.19	1.38	4.41	0.68	3.14	0.78	3.47	0.89
Health, eating, and weight											
Self-appraised health	1.92	0.60	1.99	0.62	2.00	0.63	1.84	0.68	1.90	0.54	1.24
Eating habits ^c	2.59	0.75	2.39	0.80	2.50	0.58	2.69	0.74	2.65	0.74	3.32*
Weight ratio	1.18	0.24	1.18	0.22	1.21	0.31	1.21	0.25	1.17	0.24	0.65

^a Ns for smoking groups in the order shown are 96, 34, 86, and 206; the overall N is 422.

^b This F statistic tests the differences among the four smoking groups.

^c Continuous smokers differ from long term exsmokers and people who had never smoked.

† $p < .10$

* $p < .05$

TABLE 3
Time 2 Means, Standard Deviations, and Analysis of Variance Results

Variables	Continuous Smokers				Recent Exsmokers				Long-term Exsmokers				People Who Never Smoked				F ^a
	Overall		Smokers		Exsmokers		Exsmokers		Exsmokers		Exsmokers		Never Smoked				
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.			
Mood																	
Quality of life ^b	5.44	0.90	5.62	0.81	4.94	1.08	5.51	0.94	5.40	0.80	5.13**		5.40	0.80	5.13**		
Depression ^b	2.19	0.78	2.10	0.71	2.68	0.91	2.07	0.73	2.20	0.78	6.15**		2.20	0.78	6.15**		
Anxiety ^b	2.19	0.89	2.17	0.83	2.66	1.05	2.02	0.83	2.20	0.90	5.00**		2.20	0.90	5.00**		
Somatic complaints	1.73	0.67	1.73	0.69	1.97	0.84	1.72	0.71	1.69	0.84	2.14†		1.69	0.84	2.14†		
Negative affect ^b	2.81	1.02	2.64	0.84	3.35	1.22	2.70	1.01	2.84	1.04	4.85**		2.84	1.04	4.85**		
Job perceptions and attitudes																	
Job satisfaction ^b	4.93	1.18	5.01	1.23	4.22	1.36	5.09	1.07	4.92	1.16	3.05*		4.92	1.16	3.05*		
Job-related tensions ^c	2.75	1.02	2.58	0.96	3.09	1.12	2.55	0.94	2.85	1.03	3.97**		2.85	1.03	3.97**		
Absenteeism, hours/month																	
Short-term ^d	1.39	2.16	1.73	3.21	2.21	3.79	1.15	1.41	1.17	1.20	3.45*		1.17	1.20	3.45*		
Long-term	1.79	6.03	1.85	5.55	1.90	5.42	1.95	5.80	1.67	6.45	0.05		1.67	6.45	0.05		
Health, eating, and weight																	
Self-appraised health ^d	1.92	0.63	2.03	0.61	2.18	0.58	1.79	0.65	1.88	0.63	5.48**		1.88	0.63	5.48**		
Eating habits ^e	2.54	0.77	2.45	0.73	2.87	0.80	2.57	0.78	2.46	0.74	9.28**		2.46	0.74	9.28**		
Weight ratio ^f	1.22	0.26	1.20	0.23	1.31	0.40	1.27	0.27	1.19	0.23	4.40**		1.19	0.23	4.40**		

^a This F statistic tests the differences among the four smoking groups.

^b Recent exsmokers differ from the continuous smokers, and those who had never smoked.

^c Recent exsmokers differ from the continuous smokers and long-term smokers. Those who had never smoked differ from the continuous smokers and the long-term exsmokers.

^d Recent exsmokers differ from the long-term exsmokers and those who had never smoked.

^e Recent exsmokers differ from those who had never smoked. Smokers differ from recent exsmokers, long-term exsmokers, and those who had never smoked.

^f Recent exsmokers differ from the smokers and those who had never smoked. Long-term exsmokers differ from the smokers and those who had never smoked.

^g Statistic represents analysis of covariance results and adjusted means, with time 1 eating habits held constant.

† $p < .10$

* $p < .05$

** $p < .01$

differed significantly from those for long-term exsmokers and people who had never smoked. No differences were observed for long-term absence. Since short-term absence was close to being significant in the time 1 ANOVA ($p < .10$), we also performed an ANCOVA that held constant scores from time 1 with the short-term absence analysis from time 2. The results of this analysis did not differ from those of the ANOVA performed and reported above.

The weight ratio obtained indicated that recent exsmokers were more obese than smokers and individuals who had never smoked. On the average, the recent exsmokers gained 10.1 pounds between the two measurement periods. Not surprisingly, recent exsmokers also reported the highest levels of poor eating habits. Furthermore, recent exsmokers' appraisal of their own health was the poorest among the four groups, although their mean score was not significantly different from the continuous smokers' mean score.

DISCUSSION

The results of this study suggest that there may be short-term work-related consequences of smoking cessation. In particular, individuals who stopped smoking within the last year before the study reported lower levels of job satisfaction, more job-related tensions, and an increase in short-term work absence. Additionally, smoking cessation appeared to affect respondents' general mood, as indicated by lower levels for reported quality of life and increased levels of depression, anxiety, and negative affect. Poorer eating habits and high weight gain and low appraisals of personal health also seemed to be side effects of smoking cessation.

Decreases in job satisfaction and increases in job-related tensions may be thought of as work-related consequences of smoking cessation. This explanation appears to be consistent with the view that mood affects the social construction of job attitudes. Jobs are ambiguous stimuli that are subject to cognitive manipulation of meaning. People make judgments about their jobs that are based on their access to job-related information recalled from memory. If mood can affect a person's recall of past information via a mood-dependent bias in the retrieval of information, general affective state is key to understanding how individuals construct social judgments about their work. To the extent smoking cessation creates a negative shift in mood, resulting declines in job satisfaction seem to be a logical finding. In fact, further analysis of the variables assessing mood with an ANCOVA procedure indicated no main effect for smoking cessation when we held the mood variables constant. This provides additional support for the position that smoking cessation affects job perceptions through its influence on personal mood.

The cognitive processes underlying this explanation can be further described through Bower's (1981) network theory, which provides a plausible outline of how affect might be attached to information in memory. According to this theory, a prevailing mood acts as a constant source of activation

by influencing the retrieval of information. This process occurs in such a manner that information most readily available lies on intersection points in the brain between a mood and a stimulus. Therefore, when a person is developing a judgment concerning an attitude like job satisfaction, the process of retrieving stored memory will likely activate those nodes of memory that are consistent with present mood and the stimulus of the job satisfaction evaluation. In this manner, assessment of job satisfaction is mood-dependent.

This conceptual explanation could also help explain the relationship between smoking cessation and perceptions of job-related tensions. Here again, the results of an ANCOVA with the mood variables controlled indicated that smoking cessation affected job-related tensions through its influence on personal mood.

Results for smoking cessation and self-appraised health also supported our original hypothesis. Recent exsmokers' appraisals of their overall health were worse than those of long-term exsmokers and those of people who had never smoked, but they were not significantly different from those of continuous smokers. This result led us to consider the alternative explanation that the recent exsmoker group was composed of seriously ill people under doctor's orders to quit smoking. If this were true, their low mood scores might relate more to serious illness than to smoking cessation. We took two steps to test this hypothesis. First, we performed an analysis of variance on specific items of a life events inventory (Cochrane & Robertson, 1973) addressing personal illness. All respondents completed this instrument as part of the larger research investigation on health promotion. No significant differences emerged in the responses of the four groups. Second, we interviewed 11 randomly chosen respondents from the 34 in the recent exsmoker category. Only two people reported that their personal physician's recommendation to stop smoking influenced their decision to quit, and these two individuals were not seriously ill. Also, no significant differences were found between the smoking groups for long-term absence, a surrogate measure of serious illness. We concluded that the recent exsmokers were not a group of seriously ill individuals.

ANCOVA procedures also helped explain the causal sequence associated with the finding that recent exsmokers had higher short-term absence than the other smoking groups. This analysis indicated that short-term absence is a function of changes in both job satisfaction and self-appraised health status. There appear to be two paths to increased short-term absence: (1) smoking status to self-appraised health to short-term absence and (2) smoking status to mood to job satisfaction to short-term absence. Recent exsmokers appear to have greater short-term absence because they report poorer health, which is likely due to minor illnesses related to the physical withdrawal from smoking. In addition, these recent exsmokers may have lower motivation to attend work than others because they are more dissatisfied with work than the members of the other categories.

The study findings prompt questions warranting further research. How

long does the negative impact of smoking cessation last? Are these negative effects temporary? Would the results found here be altered if a broad-based smoking cessation program were available to help recent exsmokers cope with the effects of cessation? Do the observed changes in job perceptions reflect true underlying changes, or do these changes reflect how questionnaire items or issues are interpreted? On the surface, the data appear to suggest that the negative effects of smoking cessation are temporary, since mood and job-perception levels of long-term exsmokers (those who had not smoked for over a year at the time of the second data collection) did not differ from those of the continuous smokers or the people who had never smoked. It might be possible that the nature of change in job perception is more complex than we have reported here.

Because this study grouped all individuals who quit smoking between the two data collection periods into the same category, it was impossible to determine with any specificity how long smoking cessation affected mood, job perceptions, and work absence. Future research might be designed with multiple measures to clearly assess this process and determine the duration of smoking cessation's work-related consequences. How long does it take exsmokers to regain their affective equilibrium? What's involved in this process? Developing new habits or coping behaviors and building a new self-image are likely issues. If this process were better understood, smoking cessation programs might benefit.

For employers who look at smoking cessation figures and see only visions of decreased health costs and absenteeism, our results may be sobering. Recent figures on the savings available to organizations from getting employees to stop smoking (Cascio, 1987) may be overestimates, at least in the short run. If the findings reported here are generalizable, smoking cessation may well have hidden costs. The overall condition and quality of life of a person who stops smoking may initially get worse. Organizations may see such changes as increases in absenteeism and sickness as well as lowered job satisfaction. Hence, smoking cessation may result in initial cost increases to organizations. Smoking as a societal problem may be a phenomenon that gets worse before it gets better. Thus, this study may have implications for smoking policies in the workplace.

At the very least, a comprehensive approach that acknowledges the complexity of smoking cessation seems to be warranted. Since smoking is not a simple behavior, simple edicts banning smoking are probably not appropriate. More thoughtful smoking policies taking into consideration how organizations could compensate for the negative consequences of cessation identified here may be necessary. If we know that recent exsmokers will tend to see both life and work as less pleasant, that they will gain weight, be less satisfied with work, experience more job tensions, and be absent more often, what can organizations do to mitigate those effects?

This research adds to the empirical base on individual mood as a determinant of job-related cognitions. The results suggest that work percep-

tions like job satisfaction may be subject to influences, both on and off the job, that can alter the affective state of an individual.

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APPENDIX

Items Measuring Quality of Life

Respondents were asked to what extent they experienced the following:

Comfort with yourself

- Satisfaction with physical appearance
- Your physical health generally
- Tendency to practice healthy habits
- Your emotional well-being
- Self-confidence
- Self-respect, self-image

Comfort with others

- Ability to express yourself, make needs known
- Ability to listen to others, understand
- Ability to give and receive love
- Ability to get along with others
- Ability to maintain lasting relationships
- Sense of belonging, of having "roots"

Meeting the demands of life

- Ability to accept responsibility
- Ability to solve problems, make decisions
- Tendency to follow through, get jobs done
- Ability to adapt, be flexible
- Ability to cope with health risks, problems
- Ability to cope with problems of living

Enjoyment of life

- Time available for recreation, leisure
- Enjoyment of recreational activities
- Enjoyment of work or school
- Enjoyment of relationships with family, friends
- Enjoyment of community, environment
- Level of spiritual fulfillment

Items Measuring Strain

Respondents were asked how often they experienced the following:

Anxiety

- Feel tense, uptight, fidgety, nervous
- Feel irritable
- Have difficulty going to sleep or staying asleep
- Feel restless and unable to concentrate
- Misdirect anger

Depression

- Feel depressed or remorseful
- Like myself less
- Feel tired, low energy, excessive fatigue
- Think about suicide
- Become less communicative
- Feel disoriented or overwhelmed
- Let things slide
- Difficulty getting up in the morning

Somatic complaints

- Headaches
- Upset stomach or intestinal problems
- Sweaty and/or trembling hands
- Shortness of breath
- Feel dizzy or light-headed

Items Measuring Negative Affect

Respondents were asked how well the following described their feelings:

- Fearful
- Angry
- Vulnerable
- Clutched-up
- Unhappy
- Depressed
- Secure (reverse scored)
- Bitter

Items Measuring Job Satisfaction

Respondents were asked how satisfied they were with the following:

- Nature of task
- Value of the service
- Quality of the supervision
- Relations with people
- Weight of the work load
- Opportunities for advancement
- Security
- Freedom to use personal judgment/initiative
- Chance to grow and develop
- Pay and benefits

Items Measuring Eating Habits

Respondents were asked how often the following applied to them:

- I spend a lot of time thinking about dieting.

I go on eating binges and I feel out of control.
I bolt down my food when eating.
It is difficult for me to be in control of my eating in a social or business situation.
I lose control of my eating when I am tired, tense, or bored.
I eat when engaged in other activities (i.e., watching TV, reading, etc.).
I snack between meals.
I must deprive myself of certain foods in order to lose weight.
I feel guilty if I eat a "high calorie food."
I feel in control of my eating (reverse scored).

Michael R. Manning received his Ph.D. degree from Purdue University. He is currently an associate professor in the Department of Management at New Mexico State University. He previously taught at Case Western Reserve University and the State University of New York at Binghamton. His research interests focus on organizational stress and well-being and processes of organizational change and development.

Joyce M. Osland is currently completing her doctoral work in organizational behavior at Case Western Reserve University. She has an M.S.W. degree from the University of Washington and previously worked in the field of international development in numerous third-world countries. Her primary research interests are international management and stress.

Asbjorn Osland is currently completing his doctorate in the Department of Organizational Behavior at Case Western Reserve University. He has an M.B.A. degree from Case Western and an M.S.W. degree from the University of Washington. He previously managed development projects in Latin America and West Africa. His research interests focus on stress at the individual and institutional levels.

ORGANIZATION-BASED SELF-ESTEEM: CONSTRUCT DEFINITION, MEASUREMENT, AND VALIDATION

JON L. PIERCE

University of Minnesota

DONALD G. GARDNER

University of Colorado—Colorado Springs

LARRY L. CUMMINGS

University of Minnesota

RANDALL B. DUNHAM

University of Wisconsin

The article introduces the construct "organization-based self-esteem" and its measurement. We developed a partial nomological network resulting in a set of hypotheses that guided efforts to validate the construct and its measurement. Homogeneity of scale items, test-retest and internal consistency reliability, and convergent, discriminant, incremental, concurrent, and predictive validity estimates were all inspected through conducting field studies and a laboratory experiment. We present results from a validation effort involving seven studies that drew on data from over 2,000 individuals, representing diverse organizations and occupations. Results support the construct validity of the measurement and most of the hypotheses.

A number of researchers have shown an interest in investigating the role of self-esteem in a variety of organizational models. The basic hypothesis guiding most of this work suggests that the way individuals react to life experiences varies as a function of their level of self-esteem, or the extent to which they perceive themselves as competent, need-satisfying individuals (Korman, 1976). One underlying theoretical tenet regarding self-esteem is that individuals will develop attitudes and behave in ways that will maintain their level of self-esteem (Korman, 1976).¹ According to this theory, in

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¹ There are at least two competing explanations for the effects ascribed to self-esteem—self-consistency and self-enhancement (cf. Dipboye, 1977; Korman, 1976). Predictions
(continued)

work organizations, individuals with high self-esteem will develop and maintain favorable work attitudes, such as job satisfaction, and will behave productively—perform at a high level—because such attitudes and behavior are consistent with the attitude that they are competent individuals. Individuals with low self-esteem, on the other hand, will develop and maintain unfavorable work attitudes and unproductive work behaviors that are consistent with the attitude that they are people of low competence. To give an example, Hollenbeck and Brief (1987) found that high self-esteem individuals valued attainment of performance goals more than low self-esteem individuals.

CONCEPTUAL LEVELS AND MEASURES OF SELF-ESTEEM

Many researchers have argued for recognizing self-esteem as a hierarchical and multifaceted phenomenon (Shavelson, Hubner, & Stanton, 1976; Song & Hattie, 1985; Tharenou, 1979). As researchers have worked with the self-esteem construct, different levels of generality for self-esteem have emerged. Simpson and Boyle (1975) noted that researchers have measured *global self-esteem* in reference to an overall evaluation of self-worth, *role-specific self-esteem* as the self-evaluation that arises from one of life's many roles (parent, student, spouse, etc.), and *task- or situation-specific self-esteem* as the self-evaluation that results from behavior in a specific situation and representing a person's competence in a task just performed.

Many measures of global self-esteem have been developed, and some have demonstrated reasonable levels of construct validity (Crandall, 1973; Wells & Marwell, 1976; Wylie, 1974). Measures of task-specific self-esteem have also been developed, though on more of an ad hoc basis (Wells & Marwell, 1976). Nevertheless, Tharenou, after reviewing measures of self-esteem, noted that "major problems occur [in the measurement] of self-esteem" (1979: 319). Many researchers develop their own scales, fail to check for evidence of acceptable construct validity, and then begin to address substantive research issues (Schwab, 1980). Thus, Tharenou and others have called for the development and validation of measures of self-esteem specific to the domains under study—the tasks, work units, organizations, and so forth, with which a researcher is concerned.

On numerous occasions, researchers (e.g., Simpson & Boyle, 1975; Song & Hattie, 1985; Tharenou, 1979) have expressed concern over the appropriateness of a self-esteem measure included in an investigation. Research conducted on the relationship between behaviors and attitudes (Epstein, 1979) suggests that the more self-esteem is framed in a context consistent with the behavior or attitude to be predicted, the higher will be the observed corre-

based on those two explanations are similar in some situations (Dipboye, 1977) and different in others (Jones, 1973). Our purpose here was construct validation, not the theoretical testing of differential predictions. Indeed, some research has indicated that both theories are correct, depending on the type of dependent variable examined (Swann, Griffin, Predmore, & Gaines, 1987).

lation between the two variables. For instance, task-specific self-esteem should predict task-related phenomena like task performance more strongly than will global self-esteem.

Song and Hattie (1985), for example, noted that observations pertaining to the relationship between self-concept and academic performance have been confounded by the use of global and academically specific self-concept scales, which frequently fail to produce the same results. Following their observation that task-specific measures frequently predict behaviors not predicted by global measures, Simpson and Boyle (1975) challenged the wisdom of universally employing global self-esteem scales in a number of research paradigms. Observations of this nature led Tharenou (1979) to note that on numerous occasions researchers have employed global measures when it would have been more appropriate to use a more narrowly focused self-esteem construct. Global self-esteem scales are likely to be appropriate for studies of individuals within the context of total life events, but task-specific measures of self-esteem, measures that reveal a person's worthiness in a particular activity, are appropriate for very task-specific behaviors.

Thus, we observe that (1) measures of global self-esteem frequently fail to demonstrate significant relationships with measures of other constructs when employed in organizational research, (2) although measures of global self-esteem are reasonably well developed, there are few, if any, construct-valid measures of self-esteem framed in a task or organizational context, and (3) self-esteem should be measured at a level of analysis that is similar to the level of analysis of the variables with which it is being studied. Thus, organization-specific self-esteem should predict organization-related phenomena like organizational commitment more strongly than task-specific or global self-esteem, and global self-esteem should predict life satisfaction more accurately than either task-specific or organization-specific self-esteem.

ORGANIZATION-BASED SELF-ESTEEM

A Rationale for a Measure of Organization-based Self-esteem

Many of the constructs that are traditionally employed in organizational paradigms, such as turnover, climate, commitment, and citizenship, are oriented toward employees and their role within a total organization, and it is at the total-work-environment level of analysis that there is a need for an appropriate measure of self-esteem. To our knowledge, however, no construct-validated measure of self-esteem exists that is anchored in an organizational frame of reference, even though many important constructs in the organizational sciences are organization-based. We directed the present research effort toward the development and initial validation of such a measure of self-esteem, hoping that such a measure will better enable researchers to examine the effects of self-esteem in relation to other organization-based constructs.

This article introduces the construct "organization-based self-esteem"

(OBSE) and its measurement. We present results from seven studies examining the psychometric properties of a measure of the construct and an empirical validation evaluation of a partial nomological network incorporating it. The purpose of this investigation is the development and initial validation of a measure of organization-based self-esteem.

The Organization-based Self-esteem Construct

According to Coopersmith (1967), the concept "self" is complex and multidimensional. It reflects diverse attributes and capacities, some of which are manifested in external objects such as the body, and others of which are internal, consisting of feelings and beliefs. Self-esteem is only one of many concepts of self that have found their way into the organizational sciences.

Building from the work of Coopersmith (1967), Gelfand (1962), Korman (1976), and Wells and Marwell (1976), we viewed self-esteem as a self-evaluation that individuals make and maintain with regard to themselves. Self-esteem expresses an attitude of approval or disapproval of self; it is a personal evaluation reflecting what people think of themselves as individuals; it indicates the extent to which individuals believe themselves to be capable, reflecting a personal judgment of worthiness.

The concept introduced in this study is similar to other conceptualizations of self-esteem (e.g., Korman, 1976; Wells & Marwell, 1976). We define organization-based self-esteem as the degree to which organizational members believe that they can satisfy their needs by participating in roles within the context of an organization. People with high OBSE have a sense of personal adequacy as organizational members and a sense of having satisfied needs from their organizational roles in the past. Thus, organization-based self-esteem reflects the self-perceived value that individuals have of themselves as organization members acting within an organizational context. As a result, employees with high OBSE should perceive themselves as important, meaningful, effectual, and worthwhile within their employing organization.

Employees with high self-esteem are likely to have a strong sense of self-efficacy (Bandura, 1977). That is, they are likely to have strong expectations that they can execute the behaviors required for task performance. Thus, individuals who develop beliefs about their own efficacy within and across situations will simultaneously develop a strong sense of self-esteem. Efficacy perceptions at the level of specific tasks contribute to task-specific self-esteem; efficacy perceptions across a variety of organizational tasks contribute to OBSE; and efficacy perceptions that accumulate across a variety of tasks and roles contribute to the formation of global self-esteem. But organization-based self-esteem differs from perceptions of self-efficacy because it reflects an individual's self-perceived competence within an organization and self-efficacy reflects a belief that self-perceived competence can be translated into actions that will result in successful performance.

A PARTIAL NOMOLOGICAL NETWORK FOR ORGANIZATION-BASED SELF-ESTEEM

The studies reported here focused on validating a measure of organization-based self-esteem. Thus, we focused on demonstrating reliability of measurement, convergent validity, and the distinctness of OBSE from other constructs (Schwab, 1980). In addition, though we have not yet developed a complete nomological network for OBSE, we present an initial network here to guide efforts to further validate the construct and its measurement (see Figure 1). This will be done, in part, by testing hypotheses derived from this nomological network.

Properties of Organization-based Self-esteem

Korman's (1970, 1971, 1976) self-consistency motivational theory provided much of the theoretical basis for our OBSE construct. He saw self-esteem as both shaped by experiences and central to the explanation of employee motivation, attitudes, and behaviors. Extending this reasoning, we posited that experiences within an organization will shape OBSE, which will also affect organization-related behaviors and attitudes. In contrast, global self-esteem derives from an aggregation of experiences across these and many other contexts that accumulate across time. But because experienced self-worth in one domain is likely to be correlated with experienced self-worth in other domains, we expected organization-based self-esteem to be related to global self-esteem, of which it is a partial determinant. Further, we expected OBSE to be related to task-specific self-esteem. Task-specific self-esteem may partially determine experiences within an organization that lead to an individual's level of OBSE. A person with low task-specific self-esteem, for example, may perform poorly, leading to organizational sanctions and low OBSE. Thus, our first two hypotheses focus on organization-based self-esteem's relationships to levels of other types of self-esteem:

Hypothesis 1: There will be a positive relationship between organization-based self-esteem and global self-esteem.

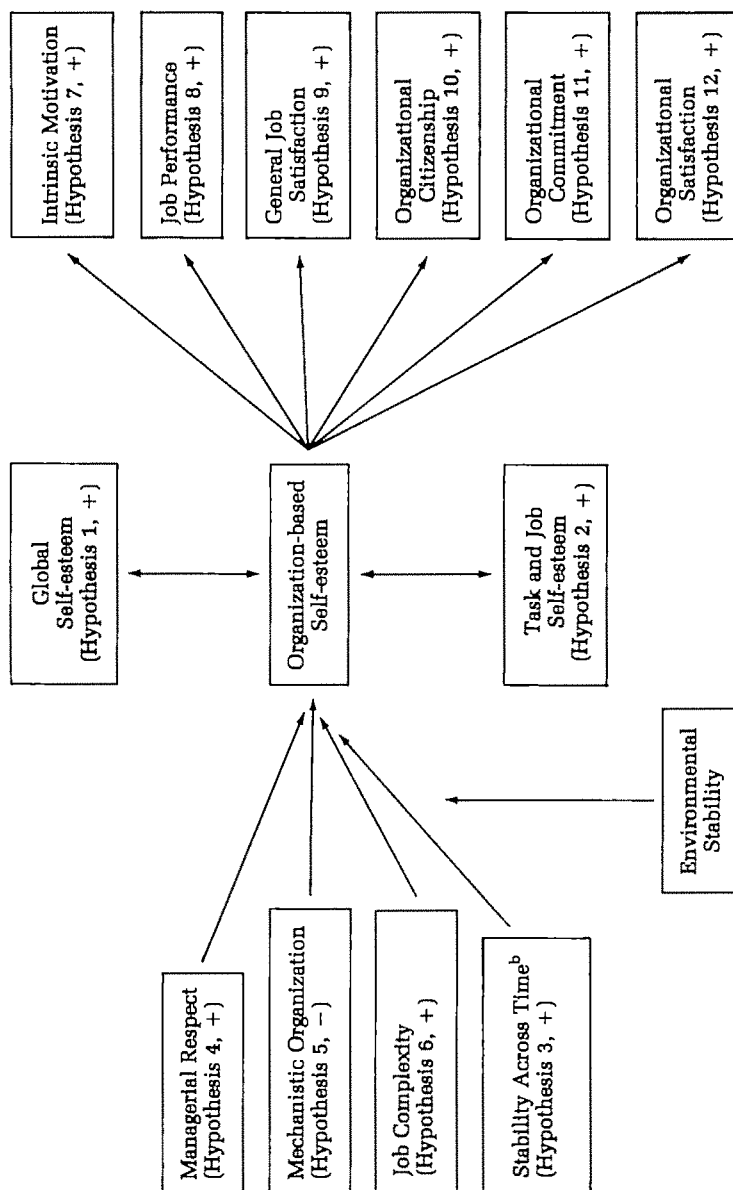
Hypothesis 2: There will be a positive relationship between organization-based self-esteem and job- or task-specific self-esteem.

Like global self-esteem, OBSE is part of an individual's basic belief system. As a part of personality, this belief system, once it is established, is relatively stable, especially when there are no major environmental changes that may give rise to new kinds of experiences. Viewing OBSE as a part of people's belief systems led to our next hypothesis:

Hypothesis 3: In the absence of major changes in work environment, organization-based self-esteem will be stable across time.

Working within the context of self-esteem's nomological network, we

FIGURE 1
Summary of Hypothesized Nomological Network Relationships of Organization-based Self-esteem to Other Constructs^a



^a The symbols + and - indicate the hypothesized directions of relationships.

^b Under conditions of environmental stability, OBSE will be stable and positively associated with itself across time.

agree with Tharenou's (1979) suggestions that the construct be treated as both a dependent and independent variable and that reciprocal effects are likely because of the nature of self-esteem (Bandura, 1978). Thus, we explore OBSE as a determinant or antecedent of behavior and attitudes and as a consequence of work-environment experiences.

Antecedents of Organization-based Self-esteem

Our nomological network specifies several expected antecedents of OBSE. Korman's (1971) review of the environmental antecedents of self-esteem suggested that both the expectations of others and situational conditions play a shaping role. Korman's reference to socially induced self-esteem suggests that the comments others direct toward people and the types of tasks assigned to them communicate messages about their value. If significant others think a person is a valuable organizational member and their comments and behaviors reflect that belief, enhanced OBSE is likely to be the consequence.

Previous research has also identified environmental conditions as major shaping factors. Korman's (1970) work suggested that in a mechanistically designed social system—a social system in which procedures, control, formality, and hierarchy are emphasized—people will develop low levels of self-esteem. Mechanistic organizations achieve a high level of system-imposed control through a rigid hierarchy, centralization, standardization, and formalization. Rules, procedures, and management actions greatly control employees' behaviors in such organizations. Korman predicted that under such organizational conditions, employees will eventually develop a belief system consonant with the apparent basic mistrust or lack of respect for people implicit in highly controlled systems. He reasoned that the development of programmed activities and high rule specification implies a mistrust in the abilities and willingness of people to complete their tasks on their own, without direction and control from others (Kipnis & Lane, 1962). In contrast, an organic social system, which is more personal and democratic and less concerned with hierarchy, procedures, formality, and control, will lead to higher levels of self-esteem with work contexts because it places inherent trust in employees as competent, valuable, contributing individuals.

An elaboration of Korman's argument would suggest that any form of system-imposed behavior control, or external control system, carries with it an assumption of the incapability of individuals to exercise self-direction and self-control. The greater the imposed control, the less self-direction and control individuals have in a system. One consequence of a highly controlled system is likely to be the suggestion to employees that they are not competent within the organizational context. Continual exposure to these signals and the absence of organizational opportunities to demonstrate and experience competence lead to low levels of organization-based self-esteem. By way of contrast, sources of environmental structure (Pierce, Dunham, & Cummings, 1984) that permit the exercise of self-direction and self-control

should be positively associated with a perception of organizational competence. Compared to individuals in work environments that control their behaviors, people in such a system have a greater opportunity to exercise competence and experience success, which contributes to self-assessments of competence.

In sum, managerial attitudes and behaviors directly expressed in manager-employee interactions and indirectly expressed via the creation of systems within which employees must function are likely to play a major role in the development of OBSE. Thus,

Hypothesis 4: There will be a positive relationship between the perception of managerial respect for organization members and organization-based self-esteem.

Hypothesis 5: Mechanistic organizational designs will cause lower levels of organization-based self-esteem than organic designs.

Tharenou's (1979) and Tharenou and Harker's (1982) reviews of the self-esteem literature suggest that job characteristics are among the most consistent correlates of individuals' assessments of their own work and task competence and worth. The most influential job characteristics for developing high self-esteem are the amount of challenge and autonomy in a job (Tharenou, 1979). In other studies, job complexity has had a consistently positive and significant relationship with global self-esteem and work and task self-esteem (Dipboye, Zultowski, Dewhirst, & Arvey, 1979; Freedman & Phillips, 1985; Sekaran & Wagner, 1981; Tharenou & Harker, 1982). Given Hackman and Oldham's (1975) job characteristics model, we might reason that employees' performance of complex jobs that suggest they are competent, valuable, and capable of self-direction and self-control will reinforce a similar belief system. That is, the opportunity to perform complex tasks that require moderate to high levels of ability should allow employees the opportunity to experience personal worth. By experiencing complex tasks, Hackman and Oldham (1975) proposed that employees will come to experience a sense of responsibility and to experience their organizational role as meaningful. Both of these psychological states should unfold, unless an individual is overmatched with his or her job. Through this process, a cognitively consistent view of the self should develop, thereby enhancing an individual's organization-based self-esteem. In addition, successful performance of complex jobs may lead to other experiences within an organization that reinforce OBSE, such as promotions. Through these processes, we expect OBSE to be related to perceived job complexity. Thus,

Hypothesis 6: There will be a positive relationship between perceived job complexity and organization-based self-esteem.

Consequences of Organization-based Self-esteem

Cognitive consistency theory assumes that people are motivated to achieve outcomes that are consistent with their self-concept (Korman, 1971:

595). This model would suggest that employees with high OBSE—employees who perceive themselves as organizationally valuable and meaningful—will attempt to engage in behaviors valued in their organization. In similar fashion, need theory (Alderfer, 1972; Maslow, 1943) and self-enhancement theory (Dipboye, 1977) would also predict that employees are motivated to engage in behaviors that demonstrate and enhance their organizational worth. To the extent that these behaviors demonstrate personal competence and make an organizational contribution, employees will derive intrinsic satisfaction, coupled with a reinforcement of their self-esteem. Subsequent success due to these behaviors should reinforce high organization-based self-esteem, and failure would reinforce low OBSE. Thus, to maintain cognitive consistency, employees with high OBSE should be motivated to perform at a high level, actually perform at a high level, have favorable attitudes about an organization, and engage in other organization-related behaviors that would benefit the organization (cf. Taylor & Brown, 1988). Low OBSE employees are predicted to do the opposite to maintain cognitive consistency. Thus, we hypothesized that OBSE would relate to the following behaviors and attitudes but again acknowledged the possibility of reciprocal causation:

Hypothesis 7: There will be a positive relationship between organization-based self-esteem and intrinsic work motivation.

Hypothesis 8: There will be a positive relationship between organization-based self-esteem and job performance.²

Hypothesis 9: There will be a positive relationship between organization-based self-esteem and general job satisfaction.

Hypothesis 10: There will be a positive relationship between organization-based self-esteem and engagement in organizationally beneficial behaviors.

Increased self-acceptance within an organizational context is likely to be associated with increased satisfaction with one's organizational association and increased attachment to the organization (organizational commit-

² Actually, performance level is expected to be a strong determinant in the formation of OBSE. As employees begin their organizational tenure, objective and subjective performance feedback provide cues about their level of competence within an organization, which determines beliefs about their self-perceived task- and organization-based worth. Because the respondent groups from which we obtained performance measures were characterized by employees with high tenure, who were likely to have already-determined beliefs about organization-based competence, we phrased the hypothesis in terms of OBSE as a cause of performance instead of vice versa.

We also note that research evidence shows that there are a host of factors that attenuate the relationship between self-esteem and performance (Brockner, 1988), even though the basic relationship should be as hypothesized.

ment). A high level of organizational self-esteem implies a correspondingly high level of experienced personal competence and organizational worth. Such a psychological state is need-satisfying and reinforcing for an individual and thus positions an organization as a need-satisfying agent in an employee's life. Because the organization satisfies needs, employees are likely to integrate the organization into their lives, to internalize the organization, and to make its goals and value systems part of their own. Thus:

Hypothesis 11: There will be a positive relationship between organization-based self-esteem and organizational commitment.

Hypothesis 12: There will be a positive relationship between organization-based self-esteem and organizational satisfaction.

Figure 1 summarizes the first 12 hypotheses in the proposed nomological network for the OBSE construct. It should be noted that the model is only a partial network for the construct and that many of these relationships are likely to involve reciprocal effects (Bandura, 1978; Tharenou, 1979).

Predictive Efficacy of Organization-based Self-esteem

Building on the concerns expressed by Song and Hattie (1985), Simpson and Boyle (1975), and Tharenou (1979) regarding the validity of self-esteem measures, the predictive accuracy of existing measures, and appropriate levels of construct measurement, we offer two additional hypotheses. Both Hypotheses 13 and 14 attempt to establish the predictive efficacy of OBSE relative to measures of task-specific and global self-esteem.

Of the several constructs examined in the series of studies reported here, organizational commitment is perhaps the perceptual target most closely aligned with the target of organization-based self-esteem. Organizational commitment is the degree to which employees are willing to take internal and external actions on behalf of their organization, and OBSE is the degree to which they see themselves as need-satisfying individuals within the context of their organizational experiences. Following the argument concerning levels of analysis made above, we would expect this relationship between OBSE and organizational commitment to be stronger than the relationship between task-specific self-esteem and organizational commitment. That is, we expect an organization-organization relationship to be stronger than a task-organization relationship. To help distinguish OBSE from task-specific self-esteem, we hypothesized that:

Hypothesis 13: There will be a stronger relationship between organization-based self-esteem and organizational commitment than between task-specific self-esteem and organizational commitment.

Continuing the level-of-analysis argument, we also expect that the organization-organization relationship will be stronger than the global-organization relationship. Consequently, we expect that the relationship be-

tween OBSE and organizational satisfaction will be stronger than the relationship between global self-esteem and organizational satisfaction. Thus,

Hypothesis 14: There will be a stronger relationship between organization-based self-esteem and organizational satisfaction than between global self-esteem and organizational satisfaction.

METHODS

Study Designs and Respondents

The studies reported here drew on seven groups of people with a combined total of 2,444 individuals. The seven studies were used to test the 14 hypotheses, but each hypothesis was not tested in each study. We examined scale dimensionality, homogeneity of scale items, reproducibility of homogeneity across studies, reliability estimates (test-retest and internal consistency), and convergent, discriminant, incremental, concurrent, and predictive validity estimates.

Table 1 identifies the study and respondents with which each of the hypotheses was tested. Respondents for study 1 were 32 summer school teachers employed by a midwestern school system. Study 2 was based on data from 333 employees of a mining firm representing a variety of occupational and skill categories. Study 3 drew on lower-, middle-, and upper-level managers from a variety of manufacturing and service-oriented organizations (e.g., utility, banking, mining, oil, education, health care); these managers participated in two laboratory-based organizational simulations. We obtained a total of 38 observations (20 for one simulated organization and 18 for the second) from the simulations. The fourth study employed 1,426 midwestern school teachers, administrators, and support workers. The fifth included 475 employees, representing all levels and job functions, from an automobile service club in a midwestern state. Study 6 used data from 96 office employees, from entry-level clerical workers through top managers, from a state educational association. Finally, the respondents for study 7 consisted of 45 evening M.B.A. students at a midwestern university, all of whom were employed full-time in various types of jobs.

Procedures

Respondents in six of the seven studies, study 3 being the exception, were administered paper-and-pencil questionnaires with questions directed toward their current full-time jobs. Procedures for study 7 varied; we gave those respondents the same questionnaire on two occasions five weeks apart. For participants in study 3, who also received a paper-and-pencil questionnaire, questions applied to simulated jobs the participants held during a three-day management development laboratory program.

The organizational simulation in study 3 was designed to create two types of organizational structures: mechanistic and organic. These differences were produced through a combination of written instructions describ-

TABLE 1
Hypotheses Tested in Studies

Hypotheses Numbers and Key Concepts	Studies and Respondents						
	Summer School Teachers 1	Mining Firm Employees 2	Managers ^a 3	School Employees 4	Automotive Service Club Employees 5	State Employees Association 6	Evening M.B.A. Students 7
1. Global self-esteem							x
2. Job- and task-specific self-esteem					x	x	
3. Stability across time	x						x
4. Managerial respect	x			x			
5. Mechanistic design			x				
6. Job complexity					x	x	
7. Work motivation					x	x	
8. Performance		x			x	x	
9. Job satisfaction	x				x	x	
10. Organizational citizenship				x	x	x	
11. Organizational commitment				x			
12. Organizational satisfaction	x	x		x	x	x	
13. Comparison with task self-esteem							x
14. Comparison with global self-esteem					x	x	x

^a The third group, managers from various firms, participated in laboratory simulations.

ing the structure and goals of the hypothetical organization and the role playing of the directors of the laboratory. All participants worked in both a mechanistic and an organic organization during three days of organizational simulations with the order of exposure to mechanistic and organic structure counterbalanced. A complete description of the simulation appears in Knudsen, McTavish, and Aamodt (1985). For a manipulation check, we obtained several structural measures—perceived authoritarianism, formality, concern for control, concern for procedures, and flexibility—to compare the two social system structures. The results indicated that participants perceived the manipulation as we intended ($F = 40.03, p < .01$). There were no significant effects for the order in which the two structures were experienced.

Measures

Organization-based self-esteem. The items in the OBSE scale were derived from comments we have often heard in discussions with employees, managers, and organizational scientists. The following demonstrates the type of comment we mean: Joel S. Birnbaum, in an interview with *Business Week* (Wilson & Harris, 1986: 116), noted that he became frustrated at IBM by the difficulty of getting his ideas to market. Emphasizing a cognition, reflecting a personalized evaluation of self-worth, that began to develop, Birnbaum said, "I had the feeling I didn't make a difference." We have come to the conclusion that it is not uncommon for employees to develop a belief that they "do not count," "do not make a difference," "are not a valuable part of this place." It was out of this context that we started the development of the OBSE measure.

The OBSE scale consists of ten items generated by us. Each of the items reflects what we would expect employees to consider in evaluating the extent to which they believe that they are valuable, worthwhile, effectual members of their employing organizations. We asked respondents in studies 1, 2, and 3 to think about the messages they received from the attitudes and behaviors of their managers and supervisors and to indicate, on a 5-point scale, the extent to which they agreed or disagreed with each of the following statements: I count around here; I am taken seriously; I am important; I am trusted; there is faith in me; I can make a difference; I am valuable; I am helpful; I am efficient; and I am cooperative. To increase adjusted item-total correlations, we later appended the wording "around here" to all items and employed this revised scale in studies 4–7. We used a 5-point Likert response scale with the ten items measuring organization-based self-esteem, except in study 4, where a 7-point scale was employed.

Other measures. To be consistent with the construct validation process (Schwab, 1980), we tried to use measures of other constructs with previously established psychometric properties, though in a few instances this could not be done.

In study 1, organization-based self-esteem was also measured with a modification of a 19-item semantic-differential global self-esteem scale de-

veloped in unreported research by Gardner and Stone.³ The modification consisted of asking for responses to the scale items based on experiences with a current job as opposed to total life-based experiences. Gardner and Stone developed this measure from (1) thoroughly reviewing existing global self-esteem measures (Crandall, 1973; Wells & Marwell, 1976; Wylie, 1974), (2) isolating 19 common dimensions across those existing measures, and (3) framing those 19 dimensions in the form of bipolar adjectives (e.g., cooperative-uncooperative, self-assured-hesitant; helpful-frustrating; efficient-inefficient; supportive-hostile). In their research, which consisted of two laboratory experiments, the semantic differential scale correlated .63 ($p < .001$) with the established Likert-type global self-esteem scale (Rosenberg, 1965). Inspection of the relationship between the Likert scales used with our OBSE measure and the semantic differential scale provides insight into issues dealing with convergent validity and method variance (Campbell & Fiske, 1959; Schwab, 1980).

Managerial respect was measured using a single Likert-type item in studies 1 and 4: "Management has little regard for the well-being of people who work for this organization." Organizational commitment was assessed in studies 1, 2, 4, 5, and 6 with either the long (15 items) or the short (9 items) form of the Porter, Steers, Mowday, and Boulian (1974) instrument. We used the following to measure general job satisfaction: in study 1, Hackman and Oldham's Job Diagnostic Survey (JDS, 1975); in study 4, the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967); and in studies 5 and 6, a combination of seven of the eight facets assessed by the Index of Organizational Reactions (IOR) (Smith, 1976). Organizational satisfaction (Dunham, Smith, & Blackburn, 1977) was measured in study 7 with a single item that read "Consider the organization that you work for and the things that you do for this organization. Circle the face on the appropriate scale which best expresses how you feel about your association with this organization" and employed the Dunham and Herman (1975) modification of Kunin's (1955) Faces scale. To measure internal work motivation, we used the JDS in study 2 and Lawler and Hall's (1970) measure of intrinsic motivation in studies 5 and 6. Organizational citizenship was measured in study 4 by a self-report version of the 16-item scale developed by Smith, Organ, and Near (1983). We measured job complexity in studies 5 and 6 with items from the Job Characteristics Inventory (Sims, Szilagyi, & Keller, 1976) for the measurement of variety, autonomy, feedback, and task identity and took significance items from the JDS. Global self-esteem was measured in study 7 with Rosenberg's (1965) 10-item questionnaire. Task- and job-based self-esteem was measured in studies 5 and 6 with a 6-item modification of the Rosenberg scale and Beehr's (1976) 3-item scale. We modified the Rosenberg

³ Our source is a personal communication from D. G. Gardner and E. F. Stone regarding unpublished self-esteem research.

scale by anchoring each item in the context of a respondent's job; for example, "I feel I have a number of good qualities" was changed to "I feel I have a number of good qualities for the performance of my job." We used supervisory ratings to measure job performance in studies 5 and 6 and also used an objective measure of performance for some of the employees in study 5. Data for that measure came from archival personnel files and reflected the most recent performance measurement before survey measures were obtained. The two measures of performance for study 5 reflected the major categories of employees at the research site: nonexempt employees, who received an hourly wage, and telemarketing employees, who received an hourly wage plus a commission for membership sales. The nonexempt performance measure was the sum of supervisory ratings on eight dimensions: knowledge, quality, quantity, initiative, dependability, adaptability, cooperation, and attitude. The performance measure for telemarketers was average dollar club-membership sales per hour during the most recent performance review period. In study 6, supervisory ratings of nonexempt employees were in one of three classes: below standard, at standard, or above standard. Table 2 summarizes information on which measures were employed in the various studies.

TABLE 2
Studies and Their Measures

Measures	Studies						
	1	2	3	4	5	6	7
Organization-based self-esteem	x	x	x	x	x	x	x
Organization-based self-esteem, semantic differential	x						
Managerial respect	x			x			
Organizational commitment	x	x		x	x	x	
General job satisfaction							
JDS	x						
IOR					x	x	
MSQ				x			
Organizational satisfaction							x
Internal work motivation							
JDS		x					
Lawler and Hall					x	x	
Organizational citizenship				x			
Global self-esteem, Rosenberg							x
Task- and job-specific self-esteem							
Rosenberg, modified					x	x	
Beehr					x	x	
Performance							
Supervisory ratings					x	x	
Archival personnel files					x		
Organic-mechanistic social system structures			x				
Job complexity					x	x	

Analyses

Descriptive statistics, reliability, and validity. Group means and standard deviations were calculated for each variable. For multiitem scales, we used coefficient alpha (Cronbach, 1951) to estimate reliability. In study 7, a test-retest estimate of reliability for organization-based self-esteem was also calculated. In addition, we calculated this test-retest correlation controlling for employee perceptions of the degree to which organizational change had occurred between the two data collections. For study 1, convergent validity evidence for the OBSE measure was obtained by correlating the scores for the Likert and semantic versions of the scale. We examined evidence on discriminant validity for that group by comparing the convergent validity coefficients to correlations of OBSE with other study variables. Convergent and discriminant validity evidence was also tested in studies 5 and 6 by comparing the correlations of OBSE with measures of job and task self-esteem and with the correlations of OBSE with other study variables. Evidence as to the incremental validity (Sechrest, 1963; Stone, 1978; Zaccaro & Stone, 1988) of OBSE derives from studies 5, 6, and 7. Incremental validity provides "some increment in predictive efficiency over the information otherwise easily and cheaply available" (Sechrest, 1963: 154). Tests of Hypotheses 13 and 14 examined the predictive efficacy of OBSE, task-specific, and global measures of self-esteem with organization-based constructs. Finally, we used principal component factor analyses with varimax rotations in studies 5 and 6 as part of the examination of discriminant and convergent validity evidence.

Tests of hypotheses. Most hypotheses that make up the OBSE network were tested through correlational analyses of the proposed relationships. We tested Hypothesis 5, involving the impact of social system design on organization-based self-esteem, using a one-way analysis of variance for differences in OBSE between mechanistic and organic settings, controlling for the order in which the simulated organizational types were experienced.

RESULTS

Since the purpose of the empirical studies was to demonstrate the construct validity of the OBSE scale, we have chosen to organize our results around several major indicators of construct validity, for example, reliability and incremental and predictive validity. Some of the tests reported here derive from the hypothesized predictions presented in the OBSE nomological network, and others reveal information about other properties (e.g., internal consistency and convergent and discriminant validity) of a construct-valid scale.

Descriptive Statistics

Table 3 presents means, standard deviations, correlations, and the size of the data set for each variable by study. Where appropriate, coefficient

alphas are also shown. Coefficient alphas for all variables in the nomological network for organization-based self-esteem reached acceptable levels.

Reliability Estimates

Coefficient alphas and test-retest correlations were calculated in order to examine the reliability of the OBSE scale. These tests provided us with insight into the scale's internal consistency, the homogeneity of scale items, and the stability of the scale's measurement across time (Hypothesis 3).

Internal consistency. Across all seven studies and eight variables, each alpha value was equal to or greater than .86, ranging to a high of .96 in study 4. The average alpha value was .91. The strength of these internal consistency estimates provides evidence for the homogeneity of the scale items.

Test-retest reliability. The test-retest reliability coefficient was .75 ($p < .01$). After we controlled for perceived organizational change, the test-retest correlation rose to .87 ($p < .01$). The strength of this association provides support for the stability of the construct proposed in Hypothesis 3.

Convergent Validity

A construct-valid scale converges more with similar measures of the same construct than with measures of substantively different constructs. We examined organization-based self-esteem in association with a semantic differential version of the OBSE scale and inspected evidence in support of the positive association between OBSE and global self-esteem (Hypothesis 1), and OBSE and job- and task-specific measures of self-esteem (Hypothesis 2).

The two OBSE measures used in the first study correlated .69 with one another (see Table 3). With one exception, a correlation of .77 between OBSE and organizational satisfaction, this association was stronger in magnitude than correlations of OBSE with any of the other non-self-esteem variables examined across the seven studies and 26 comparisons. In study 7, global self-esteem measured at time 2 had a positive ($r = .48$, $p < .01$) relationship with OBSE, also measured at time 2, thereby supporting Hypothesis 1. In studies 5 and 6, we expected that the OBSE measure would converge more with the modified Rosenberg (1965) and Beehr (1976) task-specific self-esteem measures than with other study variables. With one exception—OBSE and commitment in study 6—this was true. OBSE correlated .54 ($p < .01$) and .57 ($p < .01$) with the Rosenberg and Beehr scales in studies 5 and 6 respectively, supporting Hypothesis 2. This pattern of correlations provides convergent validity evidence for the OBSE scale.

Discriminant Validity

In order to provide additional evidence for the construct's convergent and discriminant validity, results from the three self-esteem scales (OBSE, Beehr, and Rosenberg) used in studies 5 and 6 were factor-analyzed with several other study variables: organizational commitment, job complexity, intrinsic motivation, job satisfaction, and organizational satisfaction. In both

TABLE 3
Correlation Matrixes^a

Studies	Means	s.d.	N	Correlations								
				1	2	3	4	5	6	7	8	9
1. Summer school teachers	2.97	0.89	32	(.93)								
1. Organization-based self-esteem												
2. Organization-based self-esteem semantic differential	4.79	1.24	32	.89**	(.95)							
3. Managerial respect	3.06	1.16	32	.52**	.52**	N.A.						
4. General job satisfaction	3.53	0.95	32	.45**	.48**	.26	N.A.					
5. Organizational commitment	4.20	0.99	32	.53**	.60**	.60**	.54**	(.85)				
2. Mining firm employees												
1. Organization-based self-esteem	3.53	0.59	329	(.90)								
2. Internal work motivation	3.77	0.49	326	.47**	(.82)							
3. Organizational commitment	3.20	0.61	326	.59**	.37**	(.87)						
3. Managers ^b												
1. Organization-based self-esteem	3.75	0.67	38	(.93)								
2. Organic-mechanistic comparison	19.77	7.99	30	-.46**	(.94)							
4. School district employees												
1. Organization-based self-esteem	5.18	1.41	1,403	(.98)								
2. Managerial respect	2.67	1.17	1,409	.30**	N.A.							
3. Organizational citizenship	3.79	0.52	1,314	.19**	.12**	(.71)						
4. General job satisfaction	3.69	0.56	1,368	.58**	.39**	.18**	N.A.					
5. Organizational commitment	4.40	1.25	1,399	.43**	.52**	.17**	.57**	(.89)				
5. Automobile service-club employees												
1. Organization-based self-esteem	3.86	0.56	489	(.86)								
2. Rosenberg's job self-esteem	4.12	0.54	477	.54**	(.66)							
3. Beehr's task self-esteem	4.09	0.61	480	.57**	.63**	(.72)						
4. Job complexity	3.74	0.55	462	.44**	.30**	.30**	(.66)					
5. Intrinsic work motivation	4.30	0.68	488	.21**	.25**	.25**	.26**	(.70)				
6. General job satisfaction	3.47	0.56	466	.41**	.29**	.21**	.27**	.24**	(.83)			
7. Organizational commitment	3.45	0.71	474	.50**	.31**	.34**	.28**	.30**	.71**	(.89)		
8. Performance, telemarketers	6.14	5.53	116	.11	.31**	.15	.12	.03	.07	.17*	N.A.	
9. Performance, nonexempt employees	3.80	0.47	188	.15**	.16**	.14*	.22**	.02	.07	-.06	N.A.	(.82)

TABLE 3 (continued)

Studies	Means	s.d.	N	Correlations								
				1	2	3	4	5	6	7	8	9
6. State educational association employees												
1. Organization-based self-esteem	3.98	0.54	96	(.87)								
2. Rosenberg's job self-esteem	4.28	0.52	95	.54**	(.72)							
3. Beehr's task self-esteem	4.23	0.57	96	.57**	.63**	(.73)						
4. Job complexity	3.95	0.51	93	.39**	.43**	.32**	(.66)					
5. Intrinsic work motivation	4.27	0.61	96	.30**	.30**	.09	.23*	(.83)				
6. General job satisfaction	3.66	0.60	93	.44*	.27**	.10	.17	.33**	(.83)			
7. Organizational commitment	3.63	0.68	96	.60**	.27**	.26**	.22*	.32**	.58**	(.89)		
8. Performance	1.49	0.54	55	.26*	.04	.06	.19	.08	.06	.11	N.A.	
7. Evening M.B.A. students												
1. Organization-based self-esteem, time 1	4.05	0.56	45									
	(3.98)	(0.55)	(25)	(.88)								
2. Organization-based self-esteem, time 2	3.89	0.66	45	.75**								
	(3.83)	(0.52)	(25)	(.87**)	(.93)							
3. Chronic self-esteem, time 2	3.44	0.37	41	.32*	.48**							
	(3.37)	(0.30)	(22)	(.20)	(.29)	(.82)						
4. Organizational satisfaction, time 1	5.14	1.41	44	.61**	.61**	.24						
	(5.28)	(1.28)	(25)	(.76**)	(.80**)	(.33)	N.A.					
5. Organizational satisfaction, time 2	5.00	1.33	45	.59**	.77**	.39**	.77**					
	(5.28)	(0.98)	(25)	(.70**)	(.82**)	(.34)	(.93**)	N.A.				

^aCorrelations, means, standard deviations, and N's in parentheses stem from analyses in which organizational change was controlled. N.A. = not applicable.

^bThe third group, composed of managers from various firms, participated in laboratory simulations.

* $p \leq .05$, one-tailed tests

** $p \leq .01$, one-tailed tests

studies, a two-factor solution emerged, with self-esteem forming one factor and affect forming the other (see Table 4). Across the two groups, the three self-esteem scales have average loadings of .79 on the self-esteem factor and .21 on the affect factor. The other variables averaged .26 on the self-esteem factor and .62 on the affect factor. Thus, OBSE associated more strongly with other measures of self-esteem than with measures of conceptually distinct variables, providing additional convergent validity evidence. The emergence of the two-factor solution, with OBSE as one factor and measures of expected organizational correlates as the second, provides evidence of discriminant validity for the measurement of organization-based self-esteem.

Incremental Validity

Hypotheses 13 and 14 were created in order to demonstrate the incremental validity of the OBSE scale. The results of tests of these two hypotheses provided evidence for the predictive efficacy of OBSE in relation to other organization-based constructs, organizational commitment and organizational satisfaction.

To discriminate the OBSE measure from measures of task-specific self-esteem, the correlations between OBSE and organizational commitment were contrasted with the correlations between task-specific self-esteem and organizational commitment (Hypothesis 13). In line with the argument for consonant levels of analysis, on the average OBSE correlated higher ($r = .55$) with organizational commitment than did the task-specific measures (average $r = .30$), providing support for Hypothesis 13. These differences were significantly different ($p < .01$) on four out of four possible contrasts. Thus, findings support the hypothesis that consonant levels of analysis produce stronger relationships, though we must also remember that the task-specific self-esteem scales were less reliable than our measure of OBSE.

Hypothesis 14 was also formulated in an effort to discriminate OBSE from measures of global self-esteem in the prediction of organization-based constructs. We compared the correlation between OBSE and organizational

TABLE 4
Rotated Factor Matrixes for Discriminability Analyses

Variables	Study 5 Factors		Study 6 Factors	
	Affect	Self-esteem	Affect	Self-esteem
1. Organization-based self-esteem	.36	.73	.50	.67
2. Rosenberg's job self-esteem	.11	.83	.02	.83
2. Beehr's task self-esteem	.05	.85	.22	.80
4. Organizational commitment	.87	.25	.76	.25
5. Job complexity	.22	.56	.07	.66
6. Intrinsic motivation	.32	.31	.43	.21
7. General job satisfaction	.88	.18	.89	.07
8. Organizational satisfaction	.92	.13	.86	-.03
Eigenvalues	3.67	1.46	3.36	1.56
Percent variance explained	45.90	18.20	42.00	19.50

satisfaction in study 7 with a similar correlation involving global self-esteem. The correlation between OBSE and organizational satisfaction at time 2 was .77 ($p < .01$) and the correlation between global self-esteem and organizational satisfaction was .39 ($p < .01$). Not only does OBSE account for 44 percent more of the criterion variance than global self-esteem, but the difference between these two correlations is statistically significant ($p < .01$). The test of Hypothesis 14 provides further evidence for organization-based self-esteem's distinctness from existing measures of self-esteem as well as evidence for the use of consonant levels of analysis in self-esteem research.

Predictive Validity

Tests of Hypotheses 5 and 12 provided evidence for the predictive validity of OBSE. We conducted a laboratory experiment manipulating conditions believed to affect OBSE to test Hypothesis 5, and examined a consequence of OBSE in a longitudinal correlation between the construct and organizational satisfaction to test Hypothesis 12.

An ANOVA was employed to examine the relationship between social system design and organization-based self-esteem. Hypothesis 5 predicted that employees experiencing a mechanistic-bureaucratic social system will experience a significantly lower level of OBSE than their counterparts in a more organic social system. Results from the ANOVA reveal a statistically significant ($F = 21.58, p < .01$) difference in OBSE across the two types of organization. Confirming the prediction, those working under the mechanistic design reported lower levels of OBSE ($\bar{x} = 33.11$) than their counterparts working under more organic organizational conditions ($\bar{x} = 41.72$). Analyses indicated that there were no significant effects on the criterion attributable to the order of laboratory experiences.

The product-moment correlations were inspected to gain clearer insight into the relationship between social system structure and OBSE. Six of the seven design variables, concern for procedures being the single exception, had significant correlations with the OBSE scale ($r = -.32, p < .05$ to $r = -.54, p < .01$). The direction of these relationships suggests that employees exposed to high levels of impersonality, authority, formality, concern for control, and inflexibility and to low levels of democracy tend to develop a psychological state in which their OBSE is low. Individuals who experienced a social system with the opposite design features developed high OBSE. Because of the strong intercorrelations among the social-system structure variables, however, a unit-weight model depicting a mechanistic-organic social system design was constructed and correlated with the criterion (see Table 3). This relationship ($r = -.46, p < .01$) suggests that as a social system becomes increasingly mechanistic, OBSE decreases. This pattern provides support for the construct validity of our OBSE measure (Hypothesis 5) and for one of Korman's (1976) major hypotheses.

Organization-based self-esteem was also hypothesized to predict an employee's level of organizational satisfaction (Hypothesis 12). OBSE measured

at time 1 significantly predicted organizational satisfaction ($r = .59, p < .01$) at time 2, thereby providing support for the positive relationship between organization-based self-esteem and employee satisfaction. With the organizational change that occurred between time 1 and time 2 controlled, this relationship was somewhat stronger ($r = .70, p < .01$).

Concurrent Validity

Several hypotheses (4, 6, and 7–11) from the OBSE nomological network were examined in an effort to inspect the concurrent validity of the organization-based self-esteem scale. We positioned variation in job complexity and managerial respect (Hypotheses 4 and 6) in the nomological network as antecedents of organization-based self-esteem. Each of these variables had a significant ($p < .01$) cross-sectional correlation with the criterion. In fact, inspection of Table 3 reveals that some of these correlations are quite substantial in magnitude. The strength of these associations ranged between .30 ($p < .01$) and .52 ($p < .01$) for managerial respect and between .39 ($p < .01$) and .44 ($p < .01$) for job complexity. These observations support the hypothesized relationships. Employees who experience managerial respect and complex jobs have higher levels of OBSE than employees who do not. Five variables—organizational commitment, organizational citizenship, general job satisfaction, internal work motivation, and performance—were theoretically positioned in the nomological network as consequences of OBSE (Hypotheses 7–11). Tests confirmed all hypotheses (see Table 3) with one exception: one hypothesis was confirmed on only one of the two performance measures used in study 5. The correlation coefficients ranged between .15 ($p < .05$) for job performance (supervisory rating) to .60 ($p < .01$) for organizational commitment (self-rating). Thus, compared to employees who experience a low level of OBSE, employees with a high level tend to be better organizational citizens and better performers and to have higher job satisfaction, organizational commitment, and internal work motivation.

It might be argued that the correlations between self-report measures and organization-based self-esteem were higher than between the non-self-report measure and the construct because of methods bias (Schwab, 1980). We do not doubt that this is partially true. However, all the self-report measures used in testing these hypotheses have reasonably well-known psychometric properties, and thus the impact of method variance is likely to be low (Spector, 1987). Moreover, this pattern of correlations could also be due in part to the performance appraisal measures having lower psychometric quality than the self-report measures. We feel that the magnitude and differential pattern of correlations across measures outweigh criticisms of methods bias (cf. Gerhart, 1987).

DISCUSSION

Employees with high organization-based self-esteem perceive themselves as important, meaningful, effectual, and worthwhile within their em-

ploying organization. The results of our research on the measurement and validation of OBSE across seven studies suggest the importance of the construct and the viability of our measure of it. Our measure demonstrates consistently good internal consistency reliability, homogeneity of scale items, and stability over time. This developmental research scale possesses appropriate convergent and discriminant validity and reasonable predictive and concurrent validity when placed within a nomological network. The scale had stronger predictive efficacy in relations with other organization-based constructs than measures of global or task- and job-specific self-esteem. The evidence presented here supports our belief that OBSE is part of employees' belief systems. Both the proposed determinants and consequences of OBSE were appropriately related to OBSE in the various studies reported here. Neither the nature of the respondents involved nor the specific instruments used to measure other study variables appeared to substantially affect these relationships.

The results of the seven studies reported here suggest that the determinants of OBSE may include managerial respect, organizational structure, and job complexity. Factors influenced by organization-based self-esteem may include not only global self-esteem but also job performance, intrinsic motivation, general satisfaction, citizenship behavior, organizational commitment, and organizational satisfaction. It should be noted, however, that only two of the seven studies were longitudinal, thereby permitting few conclusions about causality. These results are not much different from those of earlier examinations of self-esteem in terms of the nature of relationships revealed: Positive experiences lead to high self-esteem, negative experiences lead to low self-esteem. But our results are some of the first to indicate that experiences in an organization affect employees' levels of organization-based self-esteem, which in turn may affect their organization-related behaviors and attitudes.

We also provide evidence that using measures with consonant targets of perception—here, organization to organization—enhances the predictive validity of those measures. In that respect, we encourage researchers interested in self-esteem to use a measure of self-esteem that is consistent in context (isometric) with the other variables under study. But we also would encourage researchers to employ multiple measures of self-esteem to continue to ascertain the degree to which different measures possess construct validity.

Although the focus of the studies reported here was construct validation and not testing theories of self-esteem, it should be noted that results supported all of the study hypotheses. It is clear that future research on organization-based self-esteem needs to provide additional longitudinal tests of both its determinants and consequences. In a more theoretical vein, we believe that our measure of OBSE may yield better predictive efficacy than task- and job-specific or global measures of self-esteem in the study of such variables as organizational commitment, organizational citizenship, organizational culture, and organizational climate and satisfaction. For example,

OBSE may moderate the relationship between organizational commitment and job performance in such a way that the relationship between commitment and performance is stronger for high OBSE employees than for low OBSE employees; these relationships would be analogous to the relationships between task-specific self-esteem, job complexity, and performance hypothesized by Tharenou and Harker (1984). In using OBSE in future hypothesis testing, researchers need to ask themselves whether the way employees view their competence in an organization directly or indirectly affects, or is affected by, other constructs of interest.

It should also be noted that organization-based self-esteem focuses on individuals' assessments of their organizational worth, which stems from a history of organizational, interpersonal, and systemic experiences. OBSE differs from such value-laden constructs as central life interest (Dubin, 1956) and job involvement (Lodahl & Kejner, 1965), which possess higher emotional-affective components. We also distinguish OBSE from such possible outcomes as self-perceptions of efficacy in performing a particular task (Bandura, 1977). Self-efficacy is frequently seen as an expectation (efficacy expectation) in "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977: 193). Future research should be directed to testing the consequent and antecedent relationships of self-efficacy and self-esteem. Future research might also be directed toward testing the intervening role of self-efficacy in the relationships between OBSE and performance accomplishments, vicarious experiences, emotional arousal, and verbal persuasion (cf. Bandura, 1977). Still other research might seek to distinguish self-consistency (Korman, 1976), self-enhancement (Dipboye, 1977), and information-screening (Taylor & Brown, 1988) explanations for effects of OBSE on organization-based employee responses. Finally, we need to learn more about the relative importance of situational factors and the attitudes and behavior of others as antecedents to organization-based self-esteem and the process through which these determinants operate.

On the basis of the research reported here, we concur with Korman's view that the structural features of work environments can and do send strong messages that shape individuals' beliefs about their organizational value. There is also evidence suggesting that individuals may well develop organizational attitudes and engage in behaviors that are consistent with their organization-based self-esteem.

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Jon L. Pierce is a professor of organization and management in the Department of Management Studies at the University of Minnesota at Duluth. He received his Ph.D. degree in management and organizational studies from the University of Wisconsin. His current research interests focus on the development of self-esteem in organizational settings, on change, and on the development of ownership in participative organizational settings.

Donald G. Gardner is an associate professor of management and organization at the University of Colorado at Colorado Springs. He received his Ph.D. degree in organizational behavior from the Krannert Graduate School of Management at Purdue University. His research interests include antecedents and consequences of employee attentional processes, activation theory and task design, and human stress and cognition.

L. L. Cummings is the Carlson Professor of Management in the Carlson School of Management, University of Minnesota. His current scholarship centers on executive focus of attention, feedback generation, and self-esteem in organizational settings.

Randall B. Dunham is a professor of organization behavior in the Graduate School of Business at the University of Wisconsin. He received his Ph.D. degree in industrial-organizational psychology at the University of Illinois. His current research interests are organizational change, self-esteem, and employee attentional processes.

PERSONAL CONSEQUENCES OF EMPLOYEE COMMITMENT

BARBARA S. ROMZEK
University of Kansas

This study examined the effect of employee commitment on individuals' nonwork and career satisfactions. Data on public employees' attitudes indicated that the individual consequences of employee commitment are positive, supporting the notion that psychological attachment to a work organization yields personal benefits for individuals. These results contradict the notion that people necessarily pay a high personal price for high levels of employee commitment and caution against viewing psychological attachment as a zero-sum phenomenon.

Scholars have long been interested in employee commitment. As with many other constructs, the scholarly literature includes diverse definitions and measures of employee commitment. The works of Buchanan (1974), Etzioni, (1975), Hall, Schneider, and Nygren, (1970), Hrebiniak and Alutto (1972), Porter, Steers, Mowday, and Boulian, (1974), Salancik (1977), and Sheldon (1971) represent most, but not all, of that diversity. Within this body of research, the various definitions share a common component: a view of employee commitment as a sense of attachment to a work organization. Some authors have emphasized that attachment in terms of such behavior as investing in a course of action (Hrebiniak & Alutto, 1972; Salancik, 1977; Sheldon, 1971). Others have emphasized an affective, emotional component: commitment as a sense of loyalty and psychological attachment (Buchanan, 1974; Etzioni, 1975; Hall et al., 1970; Porter et al., 1974; Romzek & Hendricks, 1982). The present research took the latter approach to employee commitment.

Employee commitment is generally viewed as a positive factor for both individuals and organizations (Mowday, Porter, & Steers, 1982; Simon, 1976; Stevens, Beyer, & Trice, 1978). Nonetheless, some research has questioned the notion that employee commitment always has desirable consequences for individuals and organizations (Mowday et al., 1982; Randall, 1987; Salancik, 1977). The potential for overly committed employees, usually labeled zealots, to have negative effects on organizations has long been recognized (Downs, 1967). Most research on the outcomes of employee com-

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mitment has focused on organizationally relevant consequences, such as turnover and performance behaviors (Reichers, 1985).

Very little empirical work has examined the potential relationships between employees' commitment and their personal lives (Korman & Korman, 1980; Korman, Wittig-Berman, & Lang, 1981). The current research extended work on the consequences of commitment to test whether positive or negative individual consequences result from employees' commitment. The analyses reported here use panel data; they tested the effects of employee commitment on individuals' satisfaction with their nonwork lives and career progress.

THE PERSONAL CONSEQUENCES OF COMMITMENT

Nonwork Consequences

Although previous research findings concerning the relationship between people's work and nonwork lives have been diverse (Near, Rice, & Hunt, 1980), the patterns that have emerged support the thesis that individuals' work and nonwork attitudes are related (Orpen, 1978; Romzek, 1985; Schmitt & Mellon, 1980; Staines, 1980). Among white-collar and professional employees, the prevailing pattern is one of spillover between work and nonwork lives, wherein the experiences and attitudes of the work domain influence the nonwork domain, and vice versa (Romzek, 1985; Staines, 1980).

The question of whether work affects the nonwork arena or vice versa is still unresolved. For example, Orpen (1978) found causality to be stronger from work to nonwork satisfaction than it was in the opposite direction. Schmitt and Mellon (1980) found evidence of the opposite relationship, indicating that general life satisfaction affected job satisfaction.

The question of interest to this research was whether the effect of employee commitment on nonwork satisfaction is positive or negative. Employee commitment affords individuals a chance to develop a sense of belongingness and to fulfill the human need for meaningful work. When individuals feel committed to their work organizations, they share the organizations' values. They derive personal meaning from their work experiences because pursuing organizational goals is consistent with their personal values. As a result, they feel good about themselves and what they are doing at work. In turn, these good feelings are expected to spill over into employees' nonwork lives.

Research has demonstrated that employees can sustain high psychological involvement in both their work organizations and their families (Bartolome & Evans, 1979; Romzek, 1985). In their study of chief executive officers, Margerison and Kakabadse (1984) found most of their respondents reporting satisfaction with both their work and personal lives; only 4.5 percent of the men and 3.5 percent of the women who responded reported home-work conflicts as a source of difficulty. Of course, if individuals do not have much involvement outside of their work, the potential for spillover between work

and nonwork may be small. For example, at different stages of the life cycle, people may vary in their level of involvement in their families.

Other scholars have raised questions about whether such work-nonwork spillover is necessarily positive. For example, Randall (1987) argued that employee commitment has negative consequences for individuals' ability to accommodate nonwork roles; the higher employees' organizational commitment, the more negative the personal consequences. Korman and Korman's (1980) case studies of individuals who were successful at work and felt alienated in their personal lives provide some indirect support for Randall's argument. Although that research suggested that conflict between an individual's work and nonwork life is possible, it did not support the inference that such conflict is typical or inevitable.

All of the studies cited above relied on cross-sectional data. The present study used panel data to test the consequences of employee commitment at one time on individuals' nonwork satisfaction at a later time. Since employee commitment is an affirmative phenomenon, it was expected to have a positive effect on the personal lives of committed individuals. In particular, I hypothesized that employee commitment would have positive consequences for individuals' nonwork satisfaction. In light of the potential for family involvement and age to influence the relationship between work and nonwork satisfaction, the test of this relationship included controls for both those variables.

Career Consequences

Conventional wisdom holds that organizations reward employee loyalty (Whyte, 1956). Several scholars have argued that organizational commitment is rewarded with career progress (Hacker, 1978; Kanter, 1977; Randall, 1987). If committed employees enjoy better career progress, they should also be more satisfied with their career progress than other employees.

Committed employees should also be more satisfied with their career prospects within their organization. The more commitment individuals feel toward their work organizations, the more they share a collective view of what is good for those organizations. Because such individuals share organizational values, they are less likely to see their personal career ambitions as being at odds with their organization's judgment of where they can make the best contribution. This does not mean that individuals are likely to completely subjugate personal ambitions to their organization's view. Rather, it means that highly committed employees have more trust in the organization they work for than employees with lower levels of commitment. Highly committed employees trust the organization will reward them in the future with career prospects. Hence, I hypothesized that employee commitment will have positive consequences for individuals' satisfaction with their career progress and prospects.

Of course, there are many other causes of career satisfaction. One important aspect is how satisfied individuals are with their current jobs. Although Curry and his colleagues failed to find any support for causal link-

ages between job satisfaction and organizational commitment (Curry, Wakefield, Price, & Mueller, 1986), the close connection between job and career led me to expect that job satisfaction would affect individuals' satisfaction with their career progress. In this research, I tested for the effect of employee commitment at one time on career satisfaction at a later time while controlling for the effect of job satisfaction at the latter time.

The question examined herein is whether the consequences of employee commitment on nonwork and career satisfactions are positive or negative, and the central hypothesis is that those effects are positive.

METHODS

Study Design

Design limitations in social science field research generally prevent testing for true causality, but such circumstances can be approximated through the use of panel data. The analyses in this article are based on a two-wave panel study that surveyed the attitudes of a random sample of 485 public employees in 1982 (time 1) and resurveyed those same individuals in 1984 (time 2).

The survey involved self-administered paper-and-pencil questionnaires. The respondents returned questionnaires to me by direct mail using prestamped, preaddressed envelopes. The total sample was drawn at random from personnel listings of full-time employees provided by the cooperating agencies. The agencies represented a diversity in level of government, scope of services provided, and size and constituted an availability sample.¹ For the first wave of data collection, I drew samples of 100 employees from agencies with more than 100 employees and included the entire workforces of agencies with fewer than 100 employees. I mailed questionnaires to a total of 704 employees at work; of these, 484 returned completed questionnaires, yielding a response rate for the first wave of data collection of 69 percent.

Of the 484 respondents in the original wave of data collection, 368 were still employed in the same agency in the summer of 1984, representing an overall retention rate of 76 percent.² I recontacted these 368 employees in the summer of 1984. Of those recontacted, 334 returned completed questionnaires, yielding an exceptionally high response rate of 92 percent for the second wave of data collection.

Measures

Most of the scales that comprise the variables used in this project were drawn from previous research efforts. The career satisfaction scale was de-

¹ There were nine cooperating agencies: three federal offices, three state agencies, and three local governments in Kansas and Missouri.

² This figure is consistent with recent figures citing a turnover rate for public employees of between a sixth and a quarter of the workforce per year (Stillman, 1987).

veloped for this study. For the exact wording of the items used in the various scales, see the Appendix.

Organizational involvement. Organizational involvement was the concept used in this study to measure employee commitment. This organizational involvement measure is similar to that proposed by Etzioni (1975); it represents a continuum of psychological attachment to an organization that ranges from positive affect, or organizational commitment, to negative affect, or organizational alienation (Romzek, 1985). Unlike one-dimensional commitment scales that only capture positive psychological attachment, the low end of the organizational involvement scale has a substantive interpretation: alienation. A low score reflects negative feelings toward an employing organization.

The positive psychological attachment items were drawn from the scales developed by Hall and colleagues (1970) and by Buchanan (1974) emphasizing identification and loyalty toward a work organization and organizational norms for commitment. Items were added to tap any negative feelings toward the organization as well. Organizational alienation items asked about conflicts between organizational responsibilities and personal values, conscience, and personal politics. In addition, I asked respondents about their friends' attitudes toward the respondents' places of employment.

These various items were subjected to separate principal components factor analyses. This first stage of factor analyses constituted conceptual cleaning and data reduction. At this stage, I used both orthogonal and oblique factor rotations to check one type of rotation solution against the other and kept only items that loaded above .50 in both analyses. Four separate scales emerged: organizational commitment, organizational norms for commitment, conscience consonance, and friends' approval of respondent's place of employment. I then conducted a second oblique factor analysis using the factor scores generated for the separate scales to ascertain the nature of the relationship among these separate factors. Each first-order factor loaded on the organizational involvement dimension with a factor loading above .30. The resultant organizational involvement scale has a Cronbach alpha of .77.

Nonwork satisfaction. The nonwork satisfaction scale was adapted from items developed by the National Opinion Research Center.³ The five-item scale measures the extent to which individuals report being satisfied with nonwork aspects of their lives, excluding their families. Specific items focus on individuals' satisfaction with their city of residence, friendships, hobbies, health and physical condition, and the recognition received for accomplishments in their personal lives. Responses are in a Likert format, and the scale's Cronbach alpha is .73.

Family involvement. The family involvement scale was first developed

³ Items were drawn from the 1977 and 1978 General Social Surveys conducted by the National Opinion Research Center at the University of Chicago.

(Romzek, 1985) using factor analyses incorporating both oblique and orthogonal rotation. I retained only items with factor loadings of .50 or higher in both solutions. The resulting five-item scale measures the extent to which individuals report their families are an important focus for their psychological attachments ($\alpha = .71$).

Age. The age variable has nine categories of 5 years each. The lowest category is for individuals 25 years of age or younger and the highest is for people over 60 years of age.

Career satisfaction. The career satisfaction scale, developed specifically for this study, measures the extent to which employees feel satisfied with their career progress to date and their career prospects in the future. The measure is a two-item scale with a Likert response format ranging from very dissatisfied (1) to very satisfied (5). The scale has a Spearman-Brown split-half reliability coefficient of .70.

Job satisfaction. The scale measuring job satisfaction, which captures an individual's positive affect toward a job, taps two of the five dimensions incorporated by Smith, Kendall, and Hulin's (1969) Job Descriptive Index: the job itself and supervision. The scale allows individuals to report their level of satisfaction in a Likert format and has a Spearman-Brown split-half reliability coefficient of .65.

RESULTS

Table 1 presents scale means, reliability coefficients, and interitem correlations.

Table 2 reports results of the first regression analysis. The first equation measures the effect of organizational involvement at time 1 on nonwork satisfaction at time 2, with controls for the effects of family involvement and age at time 2. Its results indicate that organizational involvement has a modest, but nonetheless noteworthy, positive effect on nonwork satisfaction. In fact, the effect of organizational involvement at time 1 on nonwork satisfaction at time 2 is not much weaker than the effect of family involvement at time 2 on that same variable. When the effects of age and family involvement are controlled, organizational involvement registers a beta weight of .19.

The modest strength of the relationship between organizational involvement and nonwork satisfaction is not a cause for concern. Diener (1984) noted that researchers should not expect any single trait to account for much of the variance in subjective feelings of well-being. More important, the direction of the relationship supports the hypothesis that psychological attachment to work organizations has positive personal consequences for individuals, even with a two-year time lag.⁴ People with the highest levels of

⁴ To test for the possibility of curvilinearity in the relationship between organizational involvement and nonwork satisfaction, a second regression equation was computed that included a squared organizational involvement variable. The parameter estimate for the squared organizational involvement variable in the quadratic equation was negligible ($b = -.02$).

TABLE 1
Means, Standard Deviations, and Product-Moment and Reliability Coefficients^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
Time 1														
1. Organizational involvement	3.22	0.63	.77											
2. Nonwork satisfaction	4.11	0.63	.26***	.74										
3. Family involvement	3.37	1.05	.02	.19***	.71									
4. Age	4.26	2.23	.14**	.11*	.16**									
5. Career satisfaction	3.23	0.99	.56***	.25***	-.03	-.02	.77 ^b							
6. Job satisfaction	3.90	0.80	.53***	.29***	.07	-.00	.54***	.65 ^b						
Time 2														
7. Organizational involvement	3.24	0.54	.65***	.24***	-.03	.14**	.45***	.45***	.70					
8. Nonwork satisfaction	4.08	0.55	.20***	.57***	.14**	.17**	.13*	.22***	.26***	.73				
9. Family involvement	3.82	0.62	-.08	.13*	.38***	.03	.00	.05	-.10	.27***	.71			
10. Age	4.68	2.21	.17**	.11*	.16**	.97***	.00	.01	.15**	.15**	.01			
11. Career satisfaction	3.08	0.98	.37***	.29***	.09	.02	.59***	.31***	.54***	.19***	-.06	.03	.70 ^b	
12. Job satisfaction	3.90	0.80	.40***	.32***	.03	.11*	.56***	.44***	.64***	.32***	.03	.13**	.59***	.65 ^b

^a Reliability coefficients (Cronbach alphas unless otherwise noted) are listed in the diagonals.

^b This is a Spearman-Brown split-half reliability coefficient.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 2
Results of Regression Analysis for Nonwork Satisfaction, T₂

Independent Variables	Betas
Family involvement, time 2	.24***
Age, time 2	.12*
Organizational involvement, time 1	.19***
R ²	.11
Adjusted R ²	.10
R	.33
F	13.86***
N	334

* $p < .05$

*** $p < .001$

organizational involvement enjoy the highest levels of nonwork satisfaction. Hence, the findings discredit arguments that employees' psychological attachment to their work organizations has negative consequences for them.

The second equation in the regression analyses tests the effect of organizational involvement at time 1 on the career satisfaction employees report two years later when the effects of job satisfaction at time 2 are controlled. Because organizational involvement is based on value congruence, it should be a fairly stable attitude over a two-year period.⁵

The results reported in Table 3 indicate that, when the effects of job satisfaction are controlled, organizational involvement has positive consequences for career satisfaction two years later. The beta weight of .16 for organizational involvement indicates that it has a moderate positive effect on career satisfaction. As hypothesized, the higher an employee's level of organizational involvement at time 1, the higher the satisfaction with career progress two years later.⁶

DISCUSSION

The analyses reported here indicate that organizational involvement has positive consequences for individuals. These results are consistent with research that suggests employees experience positive personal consequences from their employment (Bartolome & Evans, 1979; Kessler & McRae, 1982; Orpen, 1978; Romzek, 1985; Staines, 1980). The higher levels of organizational involvement resulted in higher nonwork and career satisfactions. Em-

⁵ To test for the stability of organizational involvement scores from time 1 to time 2, a t-test was run. The mean difference in scores from time 1 to time 2 was .06. Although this difference is statistically significant ($p < .03$), the level is substantively insignificant.

⁶ To test for the possibility of curvilinearity in the relationship between organizational involvement and career satisfaction, a second regression equation was computed that included a squared organizational involvement variable. The parameter estimate for the squared organizational involvement variable in the quadratic equation was negligible ($b = -.05$).

TABLE 3
Results of Regression Analysis for Career Satisfaction, T₂

Independent Variables	Betas
Job satisfaction, time 2	.48***
Organizational involvement, time 1	.16***
R ²	.32
Adjusted R ²	.32
R	.57
F	78.56***
N	334

*** $p < .001$

ployees with lower levels of organizational involvement are the ones who feel less satisfied with those other dimensions of their lives.

These results are consistent with the findings of Staw and Ross (1985) that individuals' job attitudes need to be interpreted in light of attitude dispositions as well as more objective work conditions. Staw and Ross noted that individuals may have predispositions in their attitudes toward work that are consistent over time and across situations. Their evidence for dispositional effects on job attitudes may help researchers to interpret the positive consequences of organizational involvement on nonwork satisfaction and career satisfactions. Perhaps highly involved employees are attitudinally disposed to view the various facets of their lives positively. Hence, they feel psychologically involved in their work organizations, and their disposition to view the world positively may affect their nonwork and career satisfactions.

These results do not support Randall's (1987) proposition about the negative consequences of commitment on employees' nonwork lives. People's psychological attachment to their work organization does not necessarily involve negative consequences or personal trade-offs for them. How can these findings be reconciled with Randall's propositions about the high personal costs people pay for high levels of organizational commitment?

The discrepancy between Randall's propositions and these data may be due to the trade-off notion built into her conceptualization of commitment. The kinds of negative costs Randall posited for personal relationships presume a zero-sum relationship between commitment and other aspects of an individual's life; for example, she proposed that high levels of organizational commitment will result in stress and tension in an individual's personal life. This trade-off reasoning reflects a subtle but important misunderstanding of the concept of commitment as psychological attachment. Unlike time, the amount of psychological attachment that people have to apportion among competing claimants (Angle & Perry, 1986; Conlon & Gallagher, 1987) is not finite. High levels of psychological attachment to a work organization does not necessarily mean a lack of psychological energy to sustain commitments to family or other aspects of nonwork life. Individuals can sustain several

psychological attachments simultaneously—work and personal involvements are not necessarily in conflict.

This tendency to link a high level of absorption with work with psychological attachment to a work organization may be the source of the discrepancy between Randall's propositions and these findings. Psychological attachment to a work organization is not the same as high absorption, or workaholism, both of which presume a preoccupation with the focal role. Employees who are highly absorbed in their jobs are so preoccupied with their work that they do not or cannot take many opportunities to get away from it. Highly absorbed employees can occupy various positions; two examples are sales agents who approach all social contacts as potential clients and design engineers who are so deeply engrossed in the particulars of their jobs that they are oblivious to interests outside of work. In some instances, outsiders who expect individuals in certain lines of work to be always "on" may impose an expectation of high absorption; for instance, people may expect ministers to be ministerial or expect celebrities to always be entertaining or glamorous.

Employees with high levels of organizational involvement have strong psychological attachment to their work organizations, but they are not necessarily exclusively or excessively absorbed in their jobs, nor are they necessarily workaholics. Employees with high levels of organizational involvement can also sustain high levels of psychological attachment to their families, their social organizations, and so on. A look at the full correlation matrix (Table 1) provides support for this notion. The synchronous measures of family and organizational involvement show very weak and statistically insignificant correlations at both time points, suggesting that those involvements are independent of each other.

Of course, there are limitations to a study like this one. The inability to control for third-variable explanations beyond age, family involvement, and job satisfaction limits the breadth of the findings. One particularly important alternative explanation for these results lies in the potential effects of attitudinal dispositions (Staw & Ross, 1985; Watson & Clark, 1984). It may be that the relationships between organizational involvement and nonwork and career satisfactions that emerged here are a function of individuals' predispositions toward positive attitudes across time and situations. There may be a type of individual who is predisposed to develop psychological involvements and a type who is predisposed to keep a psychological distance.

The former may approach their work and nonwork lives with a predisposition toward positive attitudes, with a tendency to be both psychologically involved at work and satisfied with their nonwork lives and careers. Similarly, there may be individuals who approach their work and nonwork lives with negative dispositions. They may tend to be alienated from work and have negative attitudes about various aspects of their lives, regardless of the arena. The field needs further longitudinal research that can control for such potential third-variable effects.

Other longitudinal research that includes three measurement points

would be particularly useful. It would allow tests of whether there are reciprocal effects of nonwork and career satisfactions on employees' psychological attachments to their work organizations.

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APPENDIX

Individual response totals on the items that compose each scale were summed and divided by the number of items in the scale. Values for analytic purposes ranged from 1 to 5, with 1 representing the negative end of a dimension.

Organizational involvement. Response categories were 1 = strongly disagree, 2 = disagree, 3 = mixed feelings, 4 = agree, and 5 = strongly agree.

1. Have you considered seeking employment elsewhere since you accepted employment with your present employer?
2. If I could begin working over again in the same occupation as I'm in now, I would choose this agency as a place to work.
3. I feel a strong sense of loyalty toward this organization.
4. I feel a sense of pride in working for this organization.
5. If another organization offered me more money for the same kind of work, I would accept (reverse scored).
6. On occasion I have been angered by attempts made by this organization to influence my attitudes and beliefs (reverse scored).
7. My closest friends have very favorable attitudes toward the organization for which I work.
8. There is a feeling here that employees should develop a personal commitment to this organization.
9. I often encounter situations where my professional standards are in conflict with other agency programs (reverse scored).
10. In this organization people don't care whether or not employees are committed to the organization.

11. If I had my life to live over again, I would still choose to work for this organization.

Job satisfaction. The response categories were 1 = very dissatisfied, 2 = dissatisfied, 3 = mixed feelings, 4 = satisfied, and 5 = very satisfied.

1. How satisfied are you with your job?

2. How satisfied are you with your supervisor?

Family involvement. Response categories were the same as for organizational involvement.

1. The major satisfactions in my life come from my family.

2. While my family is important to me, there are many other aspects of my life that are just as important (reverse scored).

3. The most important things that happen to me involve my family.

4. While personal friendships are an important part of life, family relationships are more important to me.

5. Taking all things together, I would describe my marriage as very happy.

Career satisfaction. Response categories were the same as for job satisfaction.

1. How satisfied are you with the career progress you have made in this organization up to now?

2. How satisfied are you with your chances for career advancement in this organization in the future?

Nonwork satisfaction. Response categories were the same as for job satisfaction.

1. How satisfied are you with the city or place you live?

2. How satisfied are you with your friendships?

3. How satisfied are you with your non-working activities, hobbies and so on?

4. How satisfied are you with your health and physical condition?

5. How satisfied are you with the recognition you get from accomplishments in your personal life?

Barbara S. Romzek earned her Ph.D. degree from the University of Texas at Austin. She is an associate professor and the chair of the Department of Public Administration at the University of Kansas. Her current research interests include employee commitment and the accountability of managers employed in the public sector.

RESEARCH NOTES

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THE RELATIONSHIP BETWEEN SEX ROLE STEREOTYPES AND REQUISITE MANAGEMENT CHARACTERISTICS REVISITED

O. C. BRENNER

James Madison University

JOSEPH TOMKIEWICZ

East Carolina University

VIRGINIA ELLEN SCHEIN

Gettysburg College

The relationship between sex role stereotypes and perceived requisite management characteristics among men and women who were managers was examined and compared with the results of studies of managers made 15 years ago. Results indicate that male middle managers still adhere to a male managerial stereotype. Female middle managers, however, no longer sex-type managerial jobs.

In the early 1970s, Schein demonstrated a relationship between sex role stereotyping and characteristics perceived as requisite for success as a manager. Two studies showed that both men (Schein, 1973) and women (Schein, 1975) who were middle managers perceived successful middle managers as possessing characteristics, attitudes, and temperaments more commonly ascribed to men in general than to women in general. Such sex role stereotyping of managerial work can result in the perception that women are less qualified than men for management positions and negatively affect women's entry into such positions (Schein, 1978).

Since the time of Schein's empirical research, both society in general and management in particular have undergone change. In 1972, women filled 19 percent of all management positions, whereas today women fill nearly 33 percent of these positions (Hymowitz & Schellhardt, 1986). However, women hold only 2 percent of senior management jobs in America's largest companies (Berlin, 1988). *Business Week's* list of the top 1,000 chief executives for 1988 included only four women, which is twice as many as in 1987. And although the rate of women's participation in managerial jobs has increased, the salaries woman managers receive do not confirm that their

The authors wish to thank Donna Shockey for her assistance with the statistical analysis.

position has bettered. Women working as managers earned 61 percent of what men earned as managers in 1986 (U.S. Department of Commerce, 1987), and only 0.6 percent of managers who earned \$100,000 per year or more were women (Stead, 1985).

Despite gains, there is a dearth of women in senior executive positions (Trafford, Avery, Thornton, Carey, Galloway, & Sanoff, 1984) and among the ranks of the highest paid individuals in major corporations (Ms., 1987). That fact suggested that the association between sex role stereotypes and characteristics people perceive as requisite for success as a manager may still be relatively strong and operative. A consensus of more than 800 American executives indicated that psychological barriers to women in management remain. Sex role stereotypes regarding women's behavior and work habits and the reasons women work have a real and negative impact on women, although there are some supportable and complex reasons for women's absence from senior management, such as their taking time out for raising children, lack of mobility, and social problems (*Small Business Report*, 1979).

The purpose of the current research was to determine to what extent the association between sex role stereotypes and requisite management characteristics existed among middle managers 15 years following Schein's initial work. Brenner and Greenhaus (1979), in a study of male and female managers and nonmanagers, found that traits such as aggression, dominance, and achievement orientation, which have been attributed to male managers, are more likely to be associated with both men and women who have attained managerial positions. Although such results imply that the male managerial stereotype may be changing, women's still-limited participation in positions of power and influence suggests the possibility of no change. Thus, we hypothesized that managers who are men will perceive successful middle managers as possessing attitudes, characteristics, and temperaments more commonly ascribed to men in general than to women in general (Schein, 1973). Although more women are in the managerial workforce today, they may still be emulating the masculine model of success. Thus, we hypothesized that woman managers will also perceive successful middle managers as possessing characteristics, attitudes, and temperaments more commonly ascribed to men in general than to women in general (Schein, 1975). Finally, since Schein previously (1973, 1975) found that age and tenure moderated these relationships, we also examined the effects of those two variables.

METHODS

Data

Data were provided by 420 men and 173 women who were managers of various departments within nine firms located in the northeastern United States. Four were manufacturing firms, four were service-oriented, and one combined manufacturing and service. Ages for the men studied ranged from 23 to 64 years, with a median of 42.0, and ages for the women ranged from

22 to 63, with a median of 40.5. The men's years of experience as managers ranged from 1 to 32, with a median of 9.0 years; the women's managerial experience ranged from 1 to 34 years, the median being 8.0 years. These demographics were very similar to those for the managers studied by Schein (1973, 1975) fifteen years earlier. The type of department, company, and position level were similar for the men and women studied.

Measuring Instrument

The Schein 92-item descriptive index (1973, 1975) was the questionnaire used to define both sex role stereotypes and characteristics of successful middle managers. The questionnaire has three forms, all containing the same descriptive terms and instructions; however, one form asks for a description of women in general, one for a description of men in general, and one for a description of successful middle managers. Each manager received only one form of the questionnaire.

The instructions on the three forms of the descriptive index were as follows:

On the following pages you will find a series of descriptive terms commonly used to characterize people in general. Some of these terms are positive in connotation, others are negative, and some are neither very positive nor very negative.

We would like you to use this list to tell us what you think (women in general, men in general, or successful middle managers) are like. In making your judgments, it might be helpful to imagine you are about to meet a person for the first time and the only thing you know in advance is that the person is (an adult female, an adult male, or a successful middle manager). Please rate each word or phrase in terms of how characteristic it is of (women in general, men in general, or successful middle managers).

Respondents rated the descriptive terms on a 5-point scale ranging from 1, not characteristic, to 5, characteristic, with a neutral rating of 3, neither characteristic nor uncharacteristic.

Procedures

Within each company, a representative with research experience was asked to randomly distribute an equal number of the three forms of the descriptive index to men and women managers. In providing each company with a supply of questionnaires, we mixed the three forms so that representatives would not inadvertently distribute the form types unevenly among different departments. The salary range was updated to \$25,000–\$55,000 from the original salary range of \$12,000–\$30,000 used in the earlier Schein studies; a gross national product implicit price deflator of 2.2 for the intervening 15 years and rounding (U.S. Department of Commerce, 1986) pro-

vided the basis for the change. The managers surveyed were not aware of the purpose of the study.

Of the total number of descriptive indexes distributed, the managers returned 694 out of 945, or 73.4 percent, to the company representatives. Depending on the company, from four to ten weeks elapsed between questionnaire distribution and the time the company representative mailed them back to us. For the questionnaires eliciting descriptions of women, men, and managers, respectively, the return rates were as follows: for the male respondents, 74.3 percent, 69.2 percent, and 75.7 percent; and for the female respondents, 72.3 percent, 73.3 percent, and 77.2 percent. The usable number of questionnaires was reduced to 420 for the men (147, 125, and 148 for the three forms in the same order as the percentages just given) and to 173 for the women (51, 61, and 61) because we eliminated questionnaires on which respondents omitted demographic data like age and gender.

Analyses

Intraclass correlation coefficients (r') from two randomized-groups analyses of variance were computed to determine the degree of similarity between the descriptions of men and managers and between the descriptions of women and managers for the men and women who responded (cf. Hays, 1963: 424). The classes, or groups, were the 92 descriptive items. In the first analysis, the scores within each class were the mean item ratings of the descriptions of men and managers, and in the second analysis, they were the mean item ratings of the descriptions of women and managers. The larger the value of r' , the more similar observations in the same class tend to be. Thus, the smaller the within-item variability, relative to the between-item variability, the greater the similarity between the mean item ratings of either the descriptions of men and managers or those of women and managers.

RESULTS

Table 1 shows intraclass correlation coefficients and the results of analyses of variance of mean item ratings. For comparison, the table includes intraclass correlation coefficients for Schein's earlier (1973, 1975) studies.

For the men responding, there was a large and significant resemblance between the ratings on the questionnaires eliciting descriptions of men and on those for descriptions of managers ($r' = .72$), whereas there was a near zero, nonsignificant resemblance between the ratings for the descriptions of women and managers ($r' = -.01$), thereby confirming the hypothesis that the men responding perceived managers as possessing characteristics more commonly ascribed to men than to women. As shown in Table 1, these results are quite similar to Schein's (1973) results for male manager respondents.

For the women in this study, there was a large and significant resemblance between the ratings on the questionnaires describing men and man-

TABLE 1
Analyses of Variance of Mean Item Ratings and Intraclass Coefficients

	Source	df	Mean Square	F	r'	Previous Results ^a
Men						
Questionnaire describing						
Managers and men						
	Between items	91	.62	6.14**	.72**	.62**
	Within items	92	.10			
Managers and women						
	Between items	91	.36	.99	-.01	.06
	Within items	92	.37			
Women						
Questionnaire describing						
Managers and men						
	Between items	91	.67	3.85**	.59**	.54**
	Within items	92	.18			
Managers and women						
	Between items	91	.62	3.15**	.52**	.30**
	Within items	92	.20			

^a Statistics for men are from Schein (1973); for women, from Schein (1975).

** $p < .01$

agers ($r' = .59$) and a similar resemblance between the ratings of the descriptions of women and managers ($r' = .52$). Although Schein (1975) found a significant resemblance for both sets of ratings, the resemblance between ratings on the questionnaires describing men and managers was significantly greater than that between the ratings for the descriptions of women and managers, thereby confirming the hypothesis predicting that pattern. Among the women in the present study, the degree of resemblance was the same for the descriptions of men and managers and those of women and managers ($z = 0.68$; n.s.). Thus, for managers who are women, the research replication did not confirm the hypothesis that managers are seen as possessing characteristics more commonly ascribed to men than to women.

The possibility that age and tenure may moderate these relationships was tested. We divided all respondents into three age levels and three tenure groups, with an approximately equal number of people distributed within each age level and tenure level within groups defined by the three forms of the questionnaire. We computed intraclass correlation coefficients between the mean ratings of descriptions of men and managers and between the ratings of descriptions of women and managers within each of the three age levels and within each of the three tenure groups. Results of these analyses indicate that neither age nor tenure moderated perception of these relationships by men or women.¹

¹ In a complete replication of Schein's studies, we also conducted an analysis of specific descriptive items on which men or women were perceived as similar to or as different from managers. Results and a complete list of items can be obtained from the first author.

Comparison of Men's and Women's Responses

Intraclass correlation coefficients were also computed between the men and women who responded to identify similarities and differences in their descriptions of women, men, and managers. Further, a comparison between the results of the present study and those of Schein (1973, 1975) was in order to determine what changes had occurred through the years. Table 2 shows both the coefficients and the comparison figures.

The ratings of descriptions of managers and men made by both the men and the women responding to the present study show a large and significant resemblance, as in the previous studies. However, where previously men and women also agreed strongly on ratings describing women ($r' = .89$), the intraclass correlation coefficient for the present study ($r' = .62$) was much lower ($z = 4.65$, $p < .01$). Moreover, the resemblance between women's descriptions of women and men's descriptions of men is stronger ($r' = .21$, $p < .05$) and significantly different from the earlier negative relationship of $-.15$ ($z = 2.43$, $p < .05$). Although agreement between men and women on descriptions of men and managers has endured over the years, apparently it has not endured for descriptions of women.

DISCUSSION

The most significant result of this study is the disparity between the men and women who responded concerning the similarity between women and managers. Results for the men confirmed the hypothesis that successful middle managers are perceived to possess those characteristics, attitudes, and temperaments more commonly ascribed to men in general than to women in general. However, results did not support a similar hypothesis for women. Women viewed successful middle managers as possessing characteristics, attitudes, and temperaments that are ascribed to both men and women in general.

TABLE 2
Intraclass Coefficients Between Respondents Grouped by Gender^a

Men Responding	Women Responding		
	1	2	3
1. Describing women	.62** (.89**)	-.16 (.10)	.09 (.07)
2. Describing men	.21* (-.15)	.88** (.92**)	.63** (.59**)
3. Describing managers	.40** (.31**)	.69** (.57**)	.95** (.89**)

^a Values in parentheses indicate the corresponding results from Schein (1973, 1975).

* $p < .05$

** $p < .01$

The disconfirmation of the hypothesis among female middle managers is clearly a result of a changed view of women. As Schein suggested, "Among women managers any lessening of the relationship may be a function of a change in the perception of women in general rather than a change in the perceptions of requirements for managerial success or perceptions of men in general" (1975: 344). Indeed, this appears to be what has happened. The female middle managers saw women in general as somewhat more resembling the way the men in the study perceived men in general to be. More important, the women in the study saw women in general as possessing many of the characteristics held by successful middle managers in general. They saw women as more likely to hold some traits necessary for success, and men as more likely to hold others. It appears that female middle managers no longer sex-type the job of manager. Unlike her male counterpart, today's female manager would be expected to treat men and women equally in selection, promotion, and placement decisions.

Although the results for women are encouraging for women aspiring to be managers, the results for men are somewhat disquieting. That male managers have not changed their attitudes over the last 15 years is a message to corporate leaders and legislators as to the importance of maintaining affirmative action pressures. The increase in the number of women in lower and middle managerial positions can be attributed, in part, to the power of the law and the internal corporate changes designed to implement the law. Such structural changes have allowed women to advance in spite of stereotypical attitudes. Women's significant progress might lead decision makers to consider reducing the emphasis on structural and legal efforts. The research shows, however, that although behaviors have changed, the underlying attitudes of male managers have not, so it is imperative that these external and internal efforts be maintained. The original attitudes persist, at least among male managers. If the structural efforts were to be reduced, we might experience a backsliding to more discriminatory practices.

Moreover, the effect that stereotypical attitudes have when no major legal or structural pressures exist can be seen in the scarceness of women in senior positions. Although in theory the law applies to all levels, in practice affirmative action efforts, such as active recruiting and training of women and numerical goal setting, focus on enhancing opportunities at entry and lower managerial levels. Affirmative action efforts rarely reach upper levels, and opportunities for subtle discrimination are far greater. The attitudes of male managers, the predominant decision makers at upper levels, have not changed, and those attitudes may well be negatively affecting women's opportunities to advance into positions of power and influence. Structural changes need to be made at this level as well. If not, affirmative action and fear of law suits will provide opportunities for women up to the middle ranks, but the strongly held attitude of "think manager—think male" among decision makers who are men will keep women confined to middle-level jobs. Given the strength and duration of stereotypical attitudes among male

managers, the results suggest that a focus on structural and perhaps legal changes is now needed to ensure equality of opportunity at senior management levels for qualified women.

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O. C. Brenner is a professor of management at James Madison University, having received his Ph.D. degree in industrial and organizational psychology from Stevens Institute of Technology. His current research interests include traits and behavior of successful managers as well as management career development.

Joseph Tomkiewicz earned his Ph.D. degree at Temple University; he is a professor of management at East Carolina University. His current research interests include perceptions about labor unions and career advancement opportunities for women and minority-group members.

Virginia E. Schein earned her Ph.D. degree in psychology from New York University. She is a professor of management at Gettysburg College. Her current research interests include power and organization development and the work-family interface.

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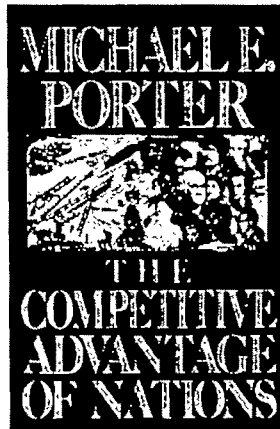
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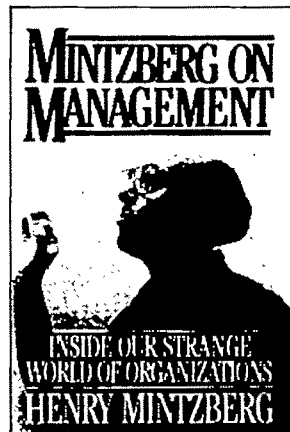
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